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Automobile Rims Made in Thirty Minutes

Rapid Movement of Material from Raw Stock Pile to
Finished Product in Cars in New Plant of
Firestone Steel Products Co.

BY F. L. PRENTISS

ONE branch of the automotive industry that has kept pace with the development of rapid production methods in plants manufacturing hundreds or thousands of completed motor cars a day is the manufacture of steel rims for demountable tires. The rim industry is so closely allied with the manufacture of tires that, when the Firestone Tire & Rubber Co., Akron, Ohio, built a new tire plant 12 years ago, it converted its old tire plant into a rim plant. To engage in the manufacture of rims on a much larger scale and with the most modern methods, the Firestone company organized in 1918 a subsidiary company under the name of the Firestone Steel Products Co., which recently has placed in operation a large plant for the economical manufacture of tire rims and various allied products, including steel bases for solid truck tires, steel felloes for truck and passenger car wheels, and other wheel accessories. The company

also manufactures braided cable, used as a reinforcement in the beads of pneumatic tires.

Heretofore Akron had consumed considerable pig iron in the manufacture of tire molds and cores, as well as rubber-making machinery, but the "Rubber City," with the building of the new Firestone plant, has now become a large consumer of rolled steel products in the form of hot-rolled sections and hot-rolled strip steel.

The Firestone plant is arranged for convenient handling and rapid straight line routing of material, from the cars in which the stock is received, through various fabricating operations and the galvanizing department, until the finished product is delivered into cars at the opposite end of the plant. The speed with which operations are carried on is indicated by the fact that, 30 min. after a piece of stock for a Ford rim leaves the steel warehouse, it rolls as a



Rims for Automobile Tires Are Circled to Form on Rim Rolls, a Battery of Which Is Shown in the Foreground

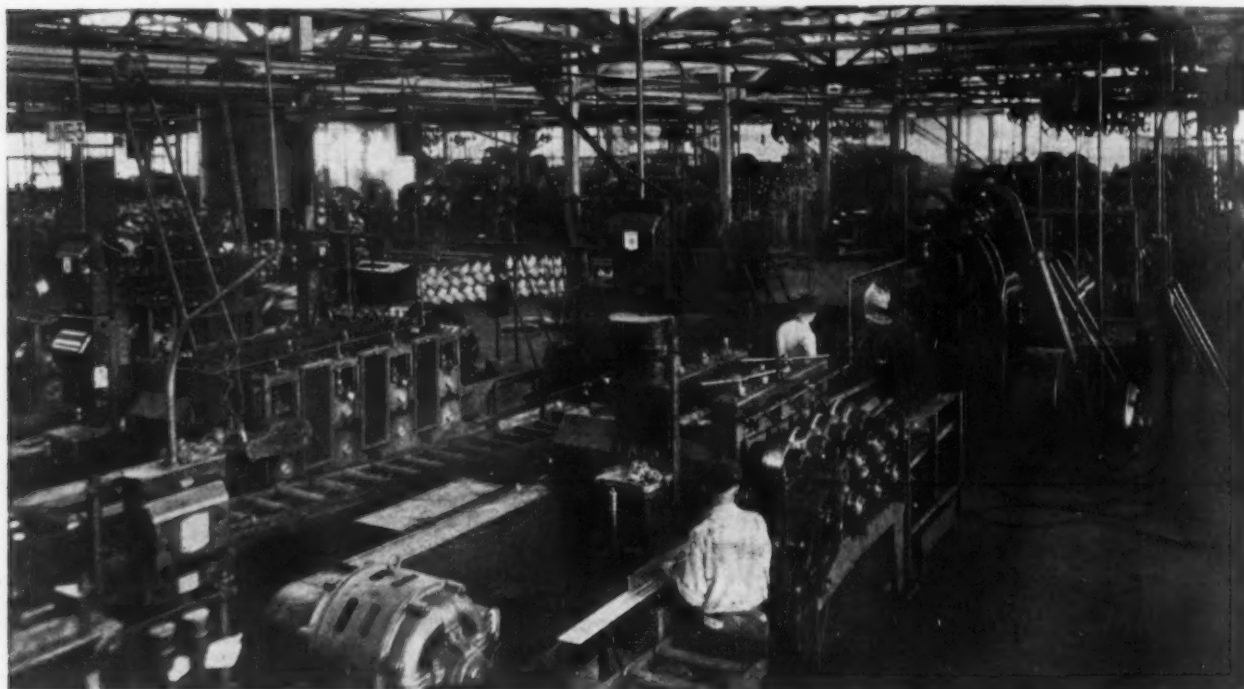
finished galvanized rim into a box car for shipment.

The main building of the plant is one-story brick and steel, 860 ft. long and 250 ft. wide, and is divided by building columns into five 50-ft. bays. At one end is the steel warehouse. The material is brought into the building on two depressed railroad tracks that enter the plant and run parallel to the outer wall on the raw material receiving side. This transverse unloading bay is served by a 6-ton Northern crane which delivers the steel from the cars to an inspection platform alongside the tracks. After inspection, the steel is stored in the five bays back of the inspection platform, the portion of each bay that is used for storage being served by a 5-ton electric traveling crane.

In transferring steel from the cars to the storage department, the stock is placed in the bay in which it is to be fabricated, so that, in the manufacturing operations, the transfer of raw material from one bay to another is avoided. Starting at the side of the stock piles, equipment in the fabricating department is arranged down the bays for successive operations in

butt welding, the flash is sheared from the weld. Then the welded rim is cold rolled to form on a rim roller, after which it is sized to correct diameter on a tire setter. This mechanically operated machine of 70 tons capacity shrinks the rim to size by exerting a pressure on the outer surface. The final fabricating operation is punching the valve hole. Then the rim is inspected for dimensions and contour by inspectors of the Tire and Rim Association. A finished rim may not vary more than $\frac{3}{64}$ in. from correct circumferential dimensions.

The manufacturing processes in making solid tire bases for truck wheels are generally similar to those used in fabricating rims, except that cold rolling to form is eliminated. However, instead of shrinking to size, as is done on the rims, the bases are stretched to size on mechanically operated machines known as expanders, having a capacity of 250 tons. These bases are made in widths up to 14 in., the largest sizes being approximately $\frac{1}{2}$ in. thick. Practically all the machinery used in the fabrication of rims and bases is



Rolls for Forming Side Flanges on Rims

eight units, each unit being complete and independent of the others. Handling of material in process is simple, as one of the first operations is rolling the rim into its circular form and, after being so formed, the piece is rolled in an upright position on a narrow gravity runway from one machine to another, the work not being placed on the floor from the time the steel is taken from the stock room until the rim is loaded on cars for shipment.

The rims are fabricated from hot-rolled steel made in various special sections, except steel felloes, which are made from flat strips. The special mill rolls required for rolling these sections are made by the steel company which supplies the steel.

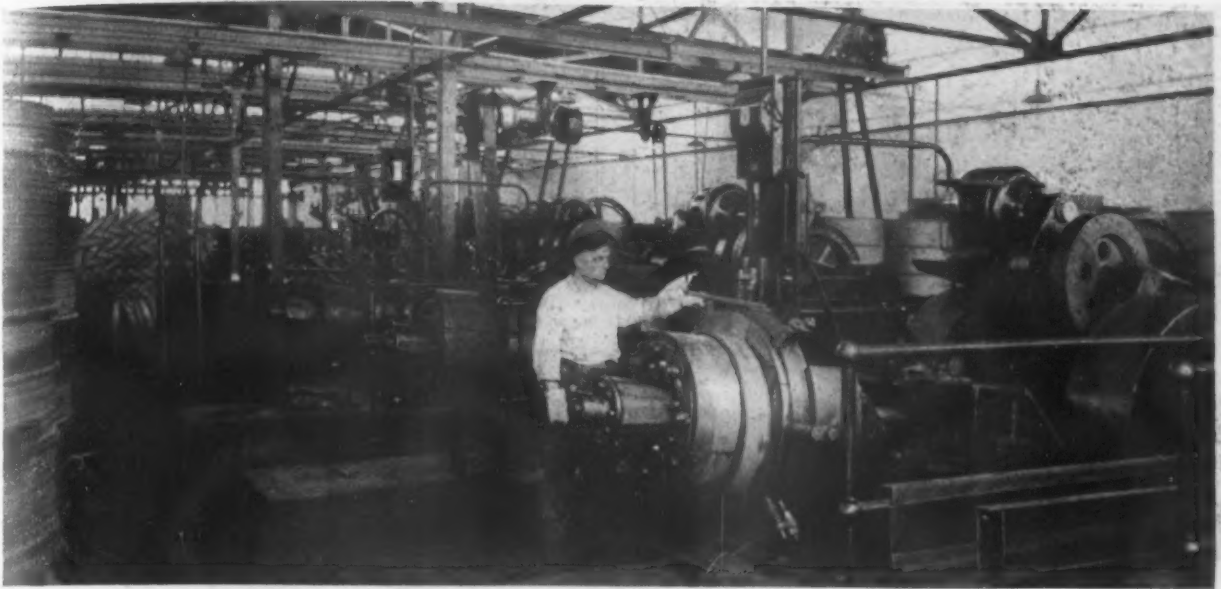
Rims are made in nine types, in widths from 3 to 10 in., in various sizes and in both the continuous and split form, the latter not having the two ends welded together after being formed. The hot-rolled steel in the special rim sections comes from the mill cut to length.

Taking a Ford rim as an example of the manufacture of a continuous rim, the first operation after leaving the stock pile is to shear the piece to exact length on a double resquaring shear, which is provided with a table for carrying the strip from the shear. The piece is then formed into a circle on a circling machine. After the two ends are joined by

necessarily of special character, and all the machinery used in the Firestone plant, except the punching machines, was designed by the company.

The galvanizing department is one of the most interesting features of the plant. This occupies a floor space 100 x 250 ft. and is equipped with two automatic machines for continuous electro-galvanizing. Rims, after inspection, pass to a conveyor on which they are elevated several feet by means of a belt above that comes in contact with the outer circumference of the rim. From this conveyor the rims pass by gravity into the galvanizing department, where the only manual labor required is in hanging the rims on an endless chain conveyor that carries them through the tanks of the galvanizing machine.

This conveyor is about 5 ft. wide and has two rows of hanging arms, these arms being approximately 4 ft. apart on the conveyor line. On each arm are two hooks, each of which carries a rim, so that the rims, as they pass through the machine, are loaded on the conveyor four abreast. Under the conveyor are six steel tanks containing the various solutions. The conveyor is so constructed that it dips into each tank, immersing the rims, and raises at the end of the tank, lifting the rims out, and continues this undulating movement over all the tanks. The various operations performed, in the order named, are cleaning,



After a Solid Tire Base for a Truck Wheel Is Formed in a Circle and Welded It Is Stretched to Size on Expanders as Shown Here

pickling, galvanizing, rinsing in hot water and drying.

After the final operation, the rim is automatically unloaded from the hook and rolls out on a gravity conveyor, passes by inspection, and through a door to the loading platform and into a car for shipment. The distance traveled in all the galvanizing department operations is approximately 200 ft., this being the length of the machine. All rims except those for disk wheels are galvanized.

There are two other automatic units in the galvanizing department. One is an oiling machine used for pickling and oiling steel felloes for wood wheels, which are not galvanized. This differs from a galvanizing machine in that the galvanizing part is omitted and in its place is an oil tank. After being dipped in this, the felloe is carried over a dripping pan. The other unit is for brass plating steel bases for solid tires. In this, the plating equipment takes the place of the galvanizing tank. Each galvanizing and plating unit has its own battery of generators

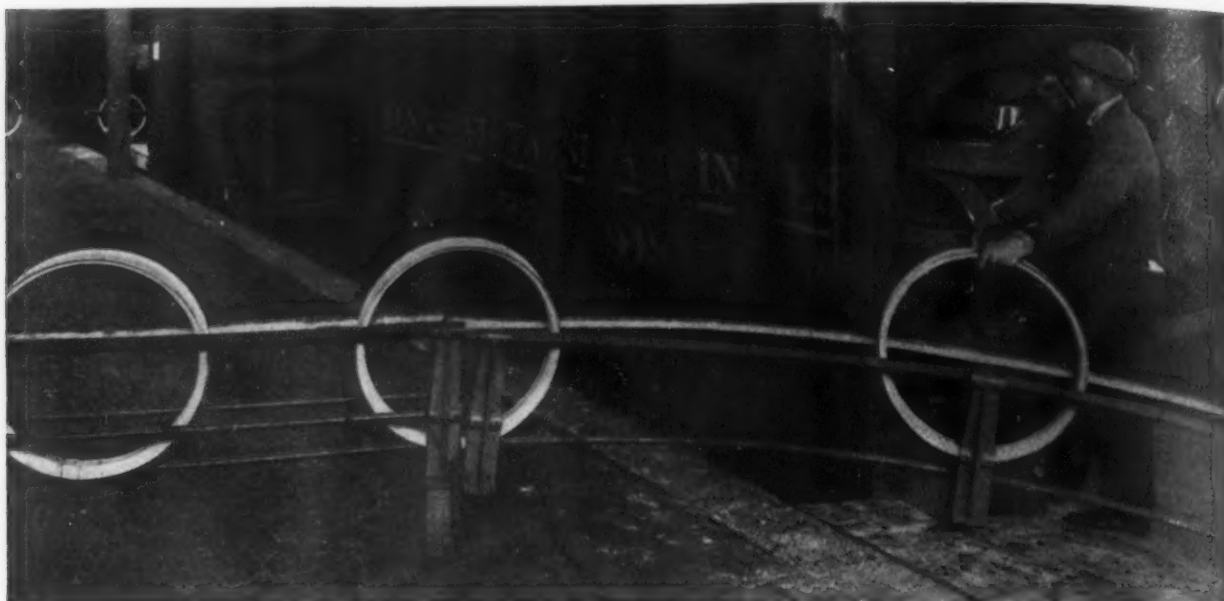
supplying 5000 amperes of current. The galvanizing and plating machines were designed by the company.

After developing steel felloes for wood wheels in the experimental department, the company now is manufacturing them on a large scale. They are made of hot-rolled strip steel. The strip is first rolled into its circular form and, after being butt welded, the circle is cold rolled to a channel shape. Holes for the tenon cups in which the spokes fit are then punched in the felloe. The finished felloe, made in various sizes and in various gages of strip steel, is supplied to wheel manufacturers, who assemble the wheel by contracting the felloe over the spokes already assembled in the felloe. The increasing scarcity of wood suitable for automobile wheels has resulted in a new outlet for the use of strip steel for felloes and, at present, 32 automobile manufacturers are using wheels with steel felloes.

Hidden inside an automobile casing and running around the tire near the flange is a closely woven



Rims Are Galvanized in Continuous Electro-Galvanizing Machines, Being Handled Through the Machines by a Continuous Conveyor That by a Downward Movement Dips the Rims into a Series of Tanks Containing the Different Solutions. The rims in the various operations in connection with galvanizing pass along on the conveyor for a distance of 200 ft. The only manual labor in connection with galvanizing is hanging the rims on the conveyor hooks, as shown at the right



After Inspection Following Galvanizing the Rims Are Rolled on Gravity Conveyors into Cars on the Shipping Side of the Plant

wire braid. The yearly demands of the tire manufacturers for this braid require considerable tonnage of light wire. One department in the Firestone plant, equipped with 90 braiding machines, is used for braiding this wire. The wire used is of high carbon steel in various gages and tinned to prevent rust. From 19 to 21 strands of wire are required to make a braid, which is manufactured in various widths.

Alternating current for welding and for the motor equipment is supplied through three 417-kva. synchronous motor-generator sets and the current to each bay is metered in order to keep records of power consumption. A high-pressure hydraulic system provides a pressure of 1100 lb. for operating the rim rollers and hydraulic presses. The galvanizing department has an exhaust system for removing the acid fumes, which are carried in ducts beneath the floor and discharged through the top of a tower at the side of the plant.

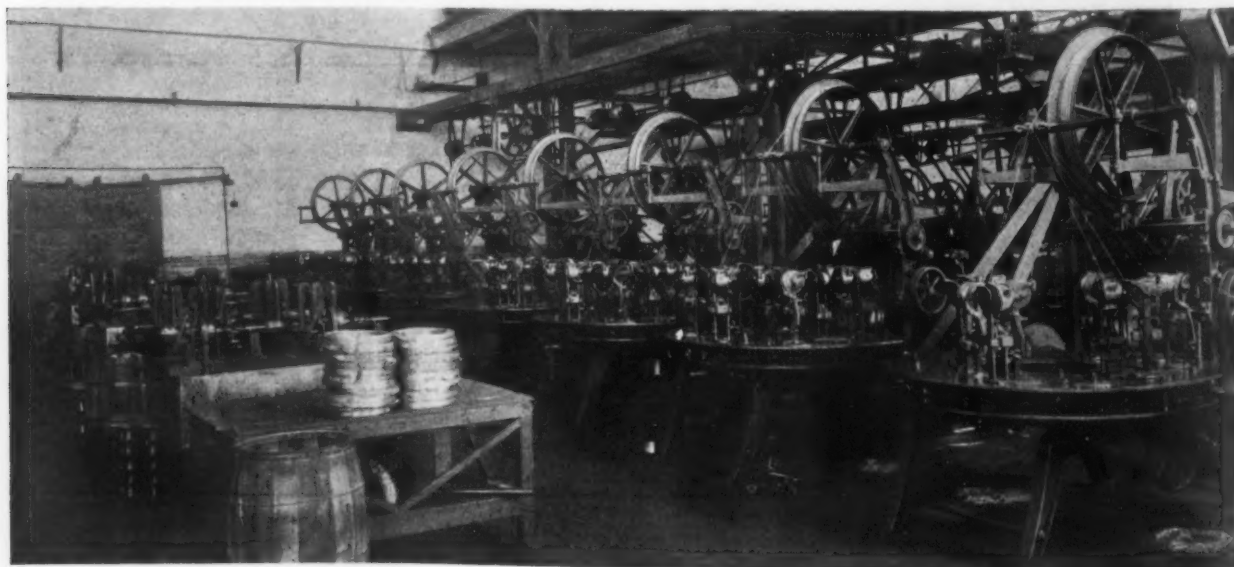
When operated at capacity, the plant consumes 1500 to 2000 tons of steel per week and, running two 8-hr. turns, has an output of 65,000 rims and parts a day. It can turn out 6000 steel bases for truck wheels a day. The company claims that its plant

has the distinction of being the only one in the country that is equipped to manufacture a complete line of rims, steel bases and felloes covering the full range of sizes.

Standards for High-Pressure Flanges

Standardization of steel flanges and flanged fittings has been taken up by the American Engineering Standards Committee, and standards have been developed for steam pressures of 250, 400, 600 and 900 lb. per sq. in. Standards for 1350, 2000 and 3200 lb. per sq. in. are being formulated. In all cases, the maximum temperature was set at 750 deg. Fahr.

For 250 and 400 lb. the two steel standards are to have the same bolt circle diameter and number of bolts as the present American cast iron standard for 250 lb., except that for the 2-in. and 2½-in. sizes the 400-lb. standard will have eight bolts instead of four. For the 600-lb. steam standard the bolt circle and number of bolts will be the same as the 800-lb. hydraulic standard developed by the American Society of Mechanical Engineers. Similarly, for the 900-lb. steam standard, the 1200-lb. hydraulic standard is adopted.



Braiding Department, Showing Some of the Machines Used in Weaving Light Wire into a Braid for Reinforcing Pneumatic Tires

SPUR GEAR GRINDING MACHINE

New Unit for Grinding Involute Teeth on Production Basis—Features Outlined

The American Grinder Co., 6534 Benson Street, Detroit, is marketing a gear grinding machine with 30 in. wheel, which, it is claimed, will grind involute teeth on a production basis, produce precise duplication of tooth contour, accurate spacing and smooth finish, the ground gears being interchangeable and running quietly.

The capacity is for gears from 2 to 8 in. pitch diameter up to 2 in. face, with teeth from 12 to 3 diametral pitch, and any pressure angle up to 25 deg. The machine is of the pure generating type, the action being that of rolling a gear along an imaginary rack with

wheel $1\frac{1}{4}$ in. of face wear is said to be obtainable.

Arrangement of the wheel head to swivel to the right or left of center up to 23 deg. is a feature of the machine. This is claimed to be of particular advantage in the case of stem gears, as the stem is placed in the holding arbor while grinding either the drive or coast side of the teeth. Without the swiveling feature, special outboard centers would be necessary, which would be inconvenient and in some cases impractical. The swiveling is also convenient in the case of some cluster gears, the wheel is reversed, and also the diamond-holding arm. The wheel head swiveled to the right 20 deg. and grinding an 18-tooth, 6-pitch stem gear on the drive side is shown in Fig. 3, the wheel swiveled to the left $14\frac{1}{2}$ deg. grinding an 18-tooth 6-pitch stem gear on the coast side being shown in Fig. 4. The latter is the position in which the wheel head is usually used on gears that may be readily reversed.

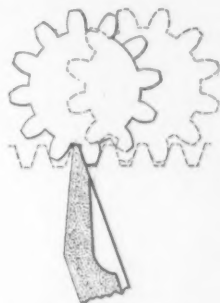


Fig. 1—Diagram Showing Generating Principle

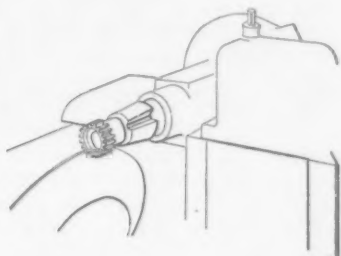


Fig. 5—Sketch of Dotted Locating Ring



Fig. 2—Front and Right Hand Side View with Water Guard in Place

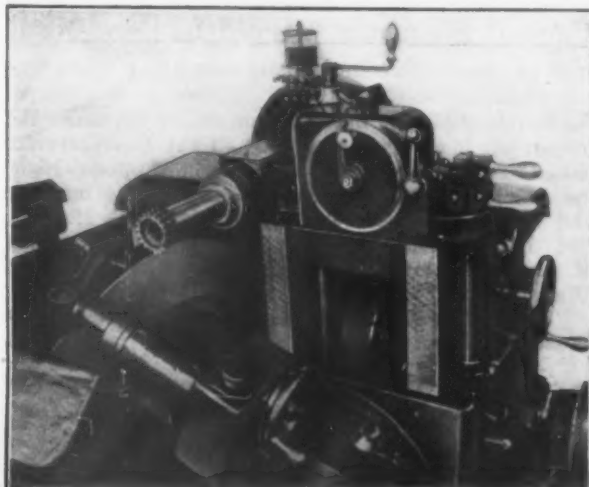


Fig. 3—Wheel Head Swiveled to Right 20 Deg.

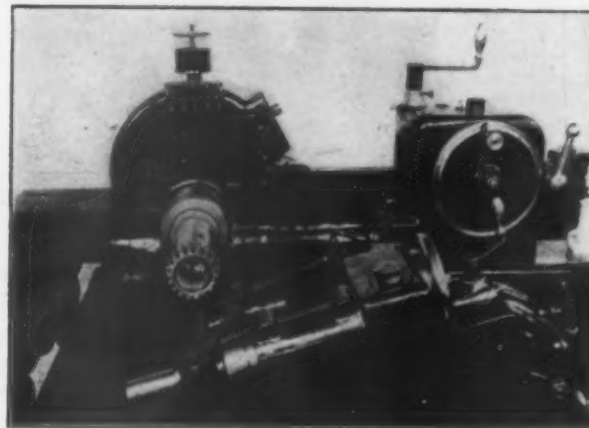


Fig. 4—Wheel Head Swiveled to Left $14\frac{1}{2}$ Deg.

the grinding wheel as one tooth of the rack as shown in Fig. 1.

The machine with water guard in place, covering the wheel and work, is shown in Fig. 2. It may be noted that the machine is compact, self-contained and has a single pulley drive. The wheel spindle is journaled low on the wheel-slide column. It has $1\frac{1}{4}$ in. lateral feed adjustment and is provided with double-endthrust ball bearings, the main bearings being of Lumen bronze, tapered on the outside to allow for wear adjustment. The feed is controlled by the 12-in. handwheel, which is provided with micrometer adjustment and a positive stop.

The straight edge of the grinding wheel at right angles to the wheel spindle does the grinding, and is kept true by means of a double worm and worm-wheel truing device. The reduction is such that while rotating the handwheel moderately, movement of the diamond is slow, which has been found necessary to secure a smooth and true grinding surface. In this design of

It may be noted that the gear is located at a convenient loading height and is accessible. When the last tooth of the gear has been ground the work carriage stops automatically. The stop is usually set to permit the gear to go around twice, making what might be called a rough and finish grind. During the second time around there is no feed up to the wheel. It is possible to set the machine so that the wheel, as well as the carriage, will stop automatically if desired. This is said to permit one operator to serve two or more machines.

The carriage stops with the gear out of the wheel, so that the arbor may be loaded and unloaded without interference. The quick and correct meshing of the gear with the grinding wheel is accomplished by means of a slotted locating ring attached to the arbor, as shown in Fig. 5. With a knife gage inserted in the ring slot and between two teeth, the gear is positioned for grinding in proper relation with the wheel.

The work spindle is taper journaled in Lumen

bronze bearings and is mounted on the carriage, which is actuated by a drum cam located in the bed of the machine. Generating motion to the work spindle is by means of steel tapes winding and unwinding on a pitch diameter circle or segment as the carriage is driven back and forth. This mechanism is located at the rear of the work spindle. Tapes are used merely to oscillate the work spindle and there is practically no load on them, this being said to permit of driving the carriage at the same speed on both small and large pinions. The tapes are 1¼ in. wide and only 0.008 in. thick. One end of one tape is attached to the segment and the other end to the tape bar, the other tape being attached in the reversed way. Screw adjustment is provided for keeping the tapes tight around the segment, producing uniform duplication of tooth contour.

The indexing mechanism is also located at the rear

of the work spindle. Hardened and ground notched plates are used, these having the same number of notches as the number of teeth on the gear to be ground. The notches are ground and lapped to very close limits to assure accuracy of tooth spacing. Less than a second is said to be required to index from tooth to tooth, and the grinding times vary according to the carriage change gears used, of which two sets are furnished as regular equipment.

The cam groove is said to provide a smooth reversing drive and to eliminate the usual load and fire mechanisms, and clutches. The stroke or the travel of the carriage is adjustable to suit the pitch of the teeth, and the position of the carriage in relation to the wheel. Slight variations of tooth contour may be made by more or less angle to the wheel, and also by varying the diameter of the pitch circle or segment.

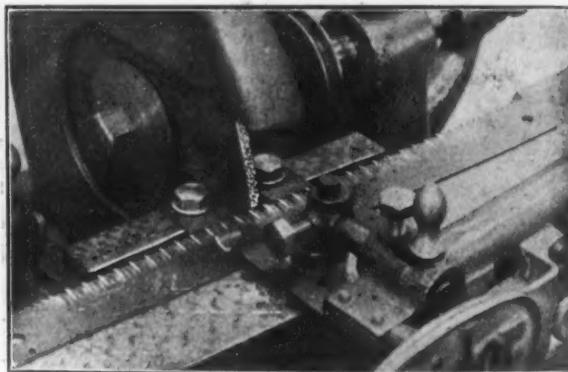
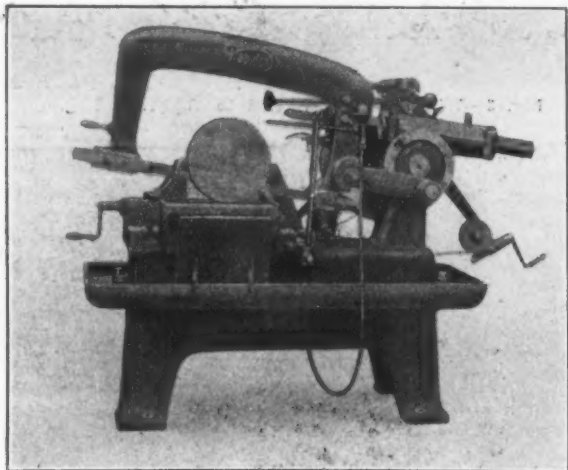
Unusual Economies Claimed for New Metal Sawing Equipment

Double the usual output, from six to ten times the output per blade used, and one-half the cost per piece sawed are claimed for the combination of special high-speed steel hack saw blade, blade sharpening machine and sawing machine developed by Edward G. Herbert, Ltd., Levenshulme, Manchester, England. The process of sawing employing this equipment is known as the "Rapidor way."

The high-speed steel blade has a patent set which is said to permit of its being resharpened many more

ground on both faces. A diamond rest is provided for truing the wheel to the correct angle. Any size or make of hack saw blade may be ground on the machine.

The sawing machine, also illustrated, is the same as the company's "Rapid" machine, but redesigned for use of the high-speed steel blade. Two sizes are available: No. 1 for 6 in. rounds or squares, and No. 2 for 10 in. rounds and other sections to 8 x 12 in. The machines may be run at 170 r.p.m. while putting heavy pressure on the blade. The main shaft and crank pin are hardened and ground. Lubrication is from a central oil reservoir. The saw holders have an indicator to permit setting of the blade at proper tension, and



Sawing Machine Using High-Speed Steel Saw Blades Is Shown at Left. The blades have a patent set and may be resharpened until original teeth have been ground away. Teeth are ground to models as shown above

times than the usual blade. The saw sharpening machine is intended to provide a simple method of sharpening the blade, assuring that the teeth are ground to the most efficient angles. The sawing machine is adapted to run at high speed and under the conditions required to get the full benefit from the high-speed steel blades.

The blades are of 18 per cent tungsten steel and are hardened throughout. The patent set extends beyond the root of the tooth and the blade may be resharpened until the original teeth have been ground entirely away, the new teeth formed being said to have sufficient set to clear themselves while sawing. It is claimed that the blades cut progressively faster after each sharpening. The blades may be sharpened on any suitable grinding machine and may be used on any sawing machine, but for best results the manufacturers recommend the special machines mentioned above.

The sharpening machine grinds the blades to models having the correct shape of teeth for quick cutting. The arrangement of the blade being ground may be noted from the accompanying illustration. The grinding wheel is stationary. The blade moves toward the wheel in contact with the models and the teeth are

the dashpot has a device to permit a start to be made on a sharp corner or square bar without danger of breaking teeth out of the saw.

Wages at Peak

Real wage earnings, or purchasing power of dollar earnings as compared with cost of living, were 39 per cent higher in August than before the war, according to figures compiled by the National Industrial Conference Board. Average hourly earnings in August were 54.8c. Average weekly earnings were \$26.59, compared with \$26.66 in July.

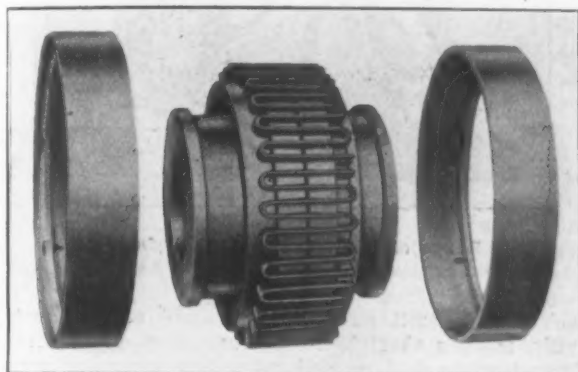
While the real hourly earnings were 39 per cent higher than in July, 1914, the real weekly earnings were only 31 per cent higher, due to the shortening of the number of hours per week. But this means that the average wage earner covered under the survey is 31 per cent better off in purchasing power than he was nine years ago, in addition to having the greater amount of leisure time indicated by the difference in length of work week.

Coupling with Unusual Flexibility as Feature

Unusual elasticity under all loads is claimed for the Falk-Bibby coupling illustrated, which is being manufactured in the United States by the Falk Corporation, Milwaukee. The coupling, the invention of James Bibby, has been made and marketed in England by the Wellman Bibby Co., Ltd.

The coupling is made up of two flanged steel disks, one of which is keyed to each shaft, a tempered steel spring in segments, forming a continuous cylindrical grid, and a shell. On the outside of the flanges are pitched cross grooves in which the spring is placed. The spring is the flexible member and its shape and that of the grooves forms the characteristic feature of the coupling.

The grooves in the disk widen inward toward each other, so that the spring fits closely in them only at



Flexible Coupling for Transmission of Power Between Shafts of Slight Parallel or Angular Misalignment. The spring is the flexible member

their outer ends. The widening of the grooves is in the form of an arc of definite radius, which bears a definite relationship to the thickness of the spring bars. It is designed so that when each bar is bent around this radius the stress in the spring cannot exceed a fixed safe value.

Under light and normal loads, there is a long free span of spring between the points of support on the two flanges, which allows for considerable flexibility. But under heavy loads the spring member becomes supported along the sides of the grooves, automatically shortening the span and stiffening the spring without increasing the stress. Under extreme overloads, the springs are supported at their inner ends and are then in shear, and capable, it is claimed, of resisting many times the load.

By sliding the shell endwise the springs may be easily withdrawn and the shafts uncoupled. Three sizes of the coupling are available, style A, B and C.

The coupling is said to compensate for want of alinement of shafts without setting up cross pulls. The amount of eccentricity which the coupling will accommodate is stated to be more than that caused by worm bearings before they require lining, or more than that by which the bearings are thrown out of line, as from expansion of casings in steam turbines.

The flexible spring member is intended to give unusual elasticity under all loads, the effect of which is to absorb shocks and damp out vibrations on such drives as rolling mills and hoists. The torsional resiliency is also emphasized as of great advantage when herringbone and other gears are used to connect a motor or turbine to a machine.

Freedom from wear and unusual overload capacity are also claimed for the coupling. The working parts are inclosed in the floating shell which provides space for the packing of lubricant.

Bradford Foote has disposed of his interests in the Foote Brothers Gear & Machine Co., Chicago, and has purchased the Crofoot Gear Works, Cambridge, Mass. He will remove the company from Cambridge to Chicago.

Proposed Organization to Meet Needs of Japan

WASHINGTON, Nov. 6.—Organization under the provisions of the Webb-Pomerene export act and the possibility of combining one or more non-competitive lines of manufacture in horizontal groups with joint sales organizations in Japan were the principal suggestions made at a meeting at the Department of Commerce with representatives of trade associations last Friday to discuss plans for more concerted action on the part of American manufacturers in supplying the needs of Japan both during the present emergency and as a possible permanent development. The meeting was called by Assistant Secretary of Commerce J. Walter Drake. No representatives of the iron and steel and related industries were present, and, while it is not thought there is any likelihood of their organizing under the Webb-Pomerene act, it is said some of them may form horizontal groups by associating themselves with chemical, electrical supply and other interests and establish joint sales forces in Japan to supply that market with iron and steel, machinery, etc. So far as the iron and steel industry is concerned, its possibilities in Japan are said to be large and business may be increased over the rather heavy orders now being placed by Japan. At the same time, it is realized that some of the business coming to American steel mills is due to the fact that British mills, which have been quoting under American producers, are already filled to capacity on certain products for Japanese business.

Pig Iron Prices Reduced in Canada

TORONTO, ONT., Nov. 5.—The outstanding feature in the Canadian pig iron market is a reduction of \$1 per ton, on all grades effective both in Toronto and Montreal. The prevailing price is No. 1 (2.25 to 2.75 silicon), \$29.30; malleable, \$29.30; No. 2 (1.75 to 2.25 silicon), \$28.30, Toronto. Montreal prices are No. 1 and malleable, \$31.20; No. 2, \$30.20. For some weeks past Canadian melters have been showing but passing interest in their requirements and buying has been confined to hand-to-mouth needs. Local blast furnace representatives say that only a few of the larger melters have placed contracts for last quarter requirements and point out that most of the present orders call for from one to two cars and all are for spot delivery. Foundries throughout Ontario and Quebec report no falling off in the daily melt, but on the contrary say that business is fairly active and production among some foundries is from 60 to 70 per cent capacity.

To Simplify Types of Heaters

WASHINGTON, Nov. 6.—Inquiry into the practicability of simplifying types, sizes, etc., of gas water heaters, combination boiler and gas water heats, gas storage tanks and pneumatic tanks has been begun as the result of a preliminary conference between representatives of manufacturers, jobbers, plumbers, gas companies and other interested groups with the Division of Simplified Practice on Monday of last week. Cooperation was pledged to the movement by various representatives and a committee was appointed to get recommendations for industries and trades concerned. The recommendations developed will be put before a later general conference for adoption.

The central committee follows:

Frank Sutcliffe, president, John Wood Mfg. Co., Conshohocken, Pa., chairman; R. M. Hudson, Division of Simplified Practice, secretary; M. H. Feldman, general manager of sales, John Wood Mfg. Co., assistant secretary.

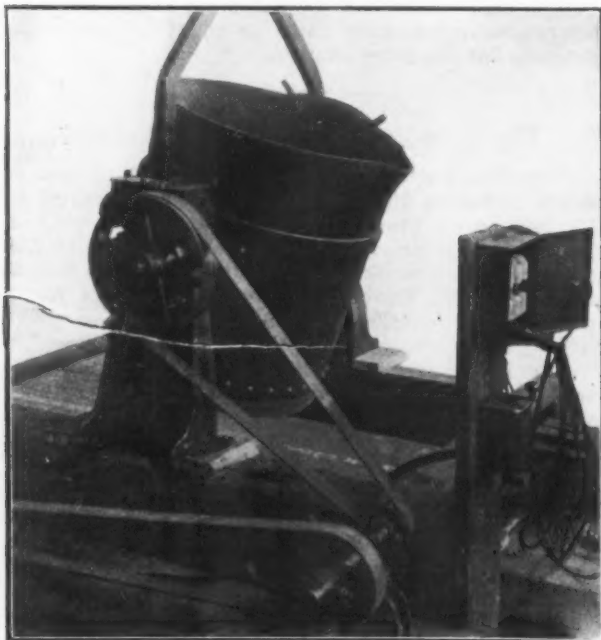
Several weeks ago the Ford Motor Co. passed the 1,500,000 mark in passenger automobiles and trucks produced in 1923. In the same period of 1922 a high record of 935,922 cars and trucks was established—now beaten by 60 per cent.

Tests of Ladle Gearing

The accompanying illustration shows the arrangement of apparatus for testing helical worm ladle gearing of the Whiting Corporation, Harvey, Ill., the test being made primarily to determine the efficiency of the gearing under actual service conditions.

An 8000-lb. capacity crane ladle was set in a pair of standards arranged so that it could revolve continuously in either direction. A standard helical worm gear bracket was mounted on ladle trunnion and the hand wheel replaced by an 18-in. pulley. A 2-hp. motor was set to drive the ladle through the jack shaft so that hand wheel shaft was running at approximately 94 r.p.m. The ratio of the gearing was $58 \frac{2}{7}$ to 1, the ladle revolving 1.6 r.p.m. A revolution counter was mounted on the idler trunnion of the ladle and an Esterline recording wattmeter placed in the motor circuit to show graphically the power required to drive the ladle at all times. A counterweight made up of round steel plates weighing 500 lb. was attached to the bottom of the ladle. The maximum power was required only at one point during the revolution of the ladle, when the counterweight was at its greatest horizontal distance from the center of the trunnion.

Starting with the ladle in vertical position and the counterweight at the bottom, turning the ladle 90 deg.



Arrangement of Apparatus For Testing Ladle Gearing

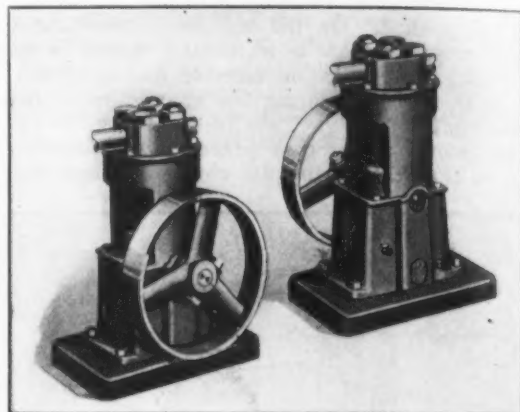
gave approximately the same amount of work for the gearing to perform as if the ladle had been used to pour its capacity of molten metal. On this basis, one complete revolution of the ladle was taken as equivalent to using the ladle twice in the foundry. After 6000 revolutions of the ladle, estimated as equivalent to about 10 years service in the average foundry, the bronze bushings in the bracket were examined. It is claimed that they were found worn perfectly smooth and only a very few thousandths of an inch loose. The pressure on the bearings of the hand wheel shaft, due to the weight of the pulley and the tension in the belt, was several times as great as would occur in ordinary operation. The power input to the motor averaged 0.8 kw. at the peak and 0.2 kw. while the counterweight was traveling downward.

The Inland Steel Co., Chicago, has been granted registration of its trademark on Inland copper alloy sheets. The company put these sheets on the market after exhaustive tests to prove the protection against corrosion which even a small amount of copper gives. The Inland sheets have a minimum copper content of 0.15 per cent.

New Line of Small Vacuum Pumps

A new line of small vertical belt-driven vacuum pumps, designated as type 15, has been brought out by the Ingersoll-Rand Co., 11 Broadway, New York.

Six sizes are available from 4 x 2 in. to 8 x 5 in. single-acting, and 10 x 5 in. and 12 x 6 in. double-acting pumps. The pumps are rated to pull and maintain vacuums between 28.6 in. and 29.25 in., depending on their size. In addition to the standard belt design



Wide Range of Sizes, Different Methods of Drive, and System of Lubrication Are Features

each size is built as a self-contained electric motor outfit, using a short belt drive arrangement or driven through pinion and internal gear. The pump and motor of both the latter arrangements are mounted on a metal sub-base, so that they are not dependent on the foundation for correct alinement.

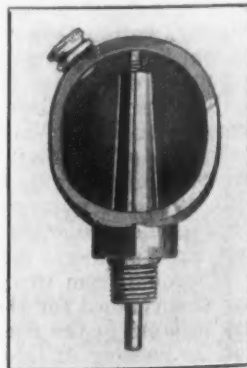
Lubrication is by means of the "constant level" system. The bottom of the pump base forms an oil reservoir of adequate capacity and the amount of oil is determined by high and low level pet cocks. Above the reservoir and directly underneath the connecting rod there is a constant level pan, into which the connecting rod dips and distributes the oil for proper lubrication. The constant level pan is replenished with oil from the supply in the crank case by a valveless oil pump operated by an eccentric on the main shaft.

The 2, 3, 4 and 5 in. stroke single-acting pumps are air cooled by means of an annular ring which encircles the cylinder, the 5 and 6 in. stroke double-acting pumps being cooled by circulating water.

Device for Lubricating Loose Pulleys

The device shown in the accompanying illustration, for lubricating loose pulleys and clutches, has been placed on the market by the Advance Specialty Co., Grand Rapids, Mich. Efficient lubrication, economy of oil, saving in oiling labor, and keeping of belts, floors and material free from oil are advantages claimed for the device. It may be screwed into the old oil hole in the hub of the pulley or clutch, and is said to provide oil for more than a month, without attention.

In this device oil is held in the reservoir and replenished as required through the threaded screw cap shown. As the pulley or clutch carrying the oiler revolves centrifugal force throws the oil to the top of the reservoir and thence through a channel leading to the bearing. This channel is almost filled by a pin, leaving just sufficient space for the delivery of a supply of oil to lubricate the bearing



Loose Pulley Oiler. Economy of oil and cleanliness are features claimed

efficiently. The pin is cut to the proper length, so that it just contacts with the bearing to be lubricated and is held in such contact by the coiled spring at the top.

When the pulley or clutch stops rotating there is a partial vacuum in the reservoir, caused by withdrawing oil to the bearing, and as centrifugal force is no longer effective in forcing oil through channel, this vacuum withdraws the oil in this channel to the reservoir.

Small Air Motor Hoist

A new style size A 500-lb. capacity air motor hoist has been placed on the market by the Ingersoll-Rand Co., 11 Broadway, New York. Compactness of design minimizing the head room required and relatively light weight are features claimed. An automatic brake is provided to hold the load if the air supply is disconnected or fails, and a graduated throttle permits close regulation of both the lifting and lowering speeds.

A balanced three-cylinder air motor, which operates



Compactness, Light Weight and Automatic Brake Are Features. A graduated throttle permits close regulation of speeds

in either direction, is employed and the advantages claimed for it include freedom from vibration, ease with which it can be throttled down slowly at all loads and freedom from lubricating troubles. The motor is geared through a mechanical train to the hoisting drum. A safety stop lever is provided to close the throttle and stop the motor when the load is raised to the top of the hoist lift.

The automatic brake, a new feature, is made up of a disk attached to the motor shaft and a brake plunger with a friction

face, which is held in contact with the disk by springs when the hoist is not operating. The motor and gears are inclosed, the motor operating in an oil bath and the gears turning in heavy grease. Oil passages lead to all bearings. Ball bearings or bronze bushings are provided where necessary.

Dominion Alloy Steel Corporation Will Build Plant at Sarnia

TORONTO, ONT., Nov. 5.—After a meeting of the directors of the Dominion Alloy Steel Corporation, held in Toronto, it was announced by W. B. Boyd, president, that the corporation plans to start work immediately on the erection of a large steel plant at Sarnia, Ont. Mr. Boyd stated that the corporation had reached its objective of \$1,000,000 in the security selling campaign in Lambton County and Sarnia and as a result the corporation is now ready to proceed with the erection of its plant. The funds raised by the campaign together with those subscribed by the directors, place the company in a position to carry out its original program. The remaining \$2,000,000 has been underwritten by F. G. Warner of Pontiac, who has managed the sale of automobile organization stock for several years, and sale has been started in Detroit and other parts of

Michigan. The Dominion Alloy Steel Corporation recently acquired 250 acres on the Indian Reserve on the St. Clair River at Sarnia, adjoining the Imperial Oil Co. property, and will erect a plant for the manufacture of high-carbon, alloy and special quality steel, none of which is at present manufactured in the Dominion. Over 100,000 tons of this alloy steel is used annually in Canada.

Harry R. Jones, formerly president of the United Alloy Steel Corporation, Canton, Ohio, has signified his willingness to join the board of directors. The officers of the Dominion Alloy Steel Corporation, are as follows: President, W. B. Boyd; C. Harold Wills, president C. H. Wills Motor Co., Marysville, Mich.; George A. Simpson, formerly special representative of the Steel Co. of Canada, Hamilton; R. V. LeSueur, M. P., Sarnia; Sir William Mackenzie, Toronto; and J. J. Mahon, consulting steel metallurgist, formerly chief engineer of the Crucible Steel Co. of America.

Electrically Heated Glue Pot

A water jacketed, electrically-heated two-quart capacity glue pot with the thermostatic control has been placed on the market by the Van Dorn Electric Tool Co., Cleveland.

The glue pot is of cast aluminum, the rim of which is machined to give an airtight fit on the water pot, and a drip ring returns condensation to the water pot. The water jacket is an iron casting ground to an airtight fit with the glue pot. The outside of the water pot is telescoped over a rim on the base to prevent the penetration of water to the heating element when re-



New Water-Jacketed Electrically Heated Glue Pot

filling the pot. Replacing of water is said to be necessary only once in three weeks.

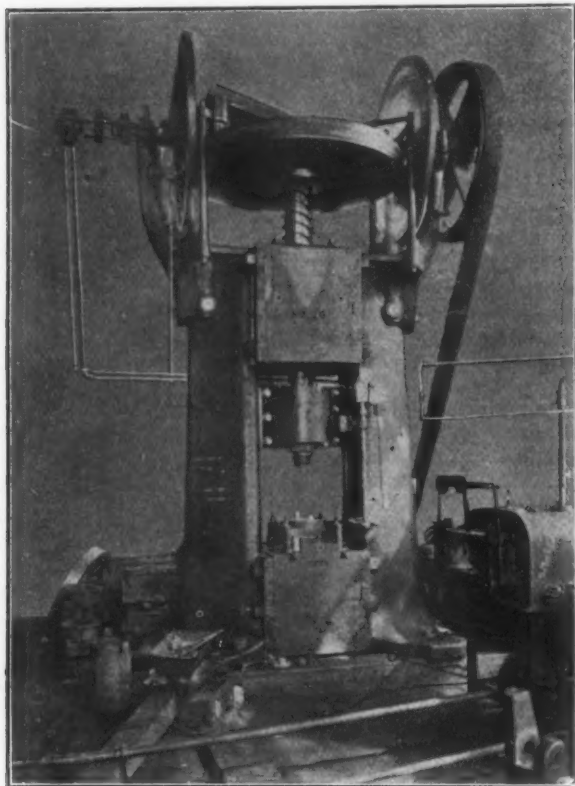
The heating element is of nichrome ribbon, insulated by mica plates and moisture proof. No cement is used. If replacement of the heating element or automatic control becomes necessary, it is claimed that the glue pot may be put back in service in 20 min. The crowned base presses the heating element solidly against the bottom of the water pot, assuring, it is claimed, thermal contact without loss of heat, an asbestos plate and air chamber in the base further providing for heat insulation. The thermostatic control is said to hold the contents of the pot at 150 deg. Fahr. with a variation of less than 5 deg. regardless of room temperature.

A general conference of representatives of manufacturers, distributors and jobbers of range boilers, together with plumbers and other interested groups, held at the Department of Commerce Oct. 30, resulted in a definite reduction in varieties and sizes of range boilers and their component parts from 130 to 13.

Screw Operated Forging Press

A new machine has been put on the market by the Zeh & Hahnmann Co., Newark, N. J., having been designed especially with a view to the use of the screw percussion idea for forging steel.

The percussion power press as built by this company in smaller sizes has been used for coining work and also for forging brass parts. These smaller machines are built with one piece arch top frames of steel in which is set a bronze nut carrying the driving screw. The new machine, known as No. 20, is of built up construction. The uprights are steel castings. The bed



The No. 20 Percussion Power Press Has Been Used Experimentally on Steel Pinion Forging to Prove Its Adaptability for the Forging of Steel as Well as Brass

and top blocks are cast iron, dovetailed into the side frames and held with body-bound nickel steel bolts. The nut is cut directly into the top block giving a cast iron bearing for the screw, rather than to use a bronze nut as in the smaller presses.

The screw is of alloy steel, heat treated, and has triple thread. The upper end of the screw is squared to receive the flywheel. This latter acts also as a friction wheel to take the drive from the two friction disks, it being faced with leather. The lower end of the screw terminates in a thrust bearing in the die-head which is carried on guides in the uprights.

The friction disks are carried on a shaft which runs in ball bearings. These being mounted on opposite sides of the flywheel, and both rotating in the same direction, tend to turn the wheel in one direction or the other, depending upon which disk is brought into contact with the periphery of the flywheel.

The shifting of the disks is controlled in this large machine by compressed air. As the driving disk is applied, the flywheel picks up motion, accelerating as the travel of the screw pulls it toward the periphery of the disk. The action is one of squeezing as the ram is forced down faster and faster, until on reaching the bottom of the stroke, the inertia stored in the wheel, when brought to a sudden stop, gives a final set to the work being formed. It is claimed for this process that the result is a more homogeneous product than is possible by other methods of forging. The ram is returned by application of the other disk to the flywheel, which causes a decelerating motion as the wheel nears the center, or smaller driving radius, of the disk, and a brake is applied to stop it. The disks remain in

neutral position until again tripped. Emergency stops are provided to avoid damage to the machine. Knock-outs may be provided for top or bottom dies if desired.

The illustration shows the machine on experimental work, making pinions from plain blanks. The finished forging has teeth formed ready for finish cutting.

One advantage claimed for this type of forging machine is that only a low temperature is necessary, which gives longer life to the dies and does not tend to change the structural characteristics of the blank.

Principal specifications are as follows:

Pressure exerted.....	400 tons
Screw diameter.....	11 in.
Weight	60,000 lb.
Stroke	20 in.
Distance slide to bed stroke down.....	14 in.
Distance between uprights.....	28 in.
Strokes per minute.....	12
Horsepower to operate.....	20

New Lists for Stove and Sink Bolts

New lists, effective Nov. 1, covering stove bolts and sink bolts, have been adopted by all leading manufacturers of these products. The principal changes in the old list are the elimination of the ¼-in. lengths over 3 in., and an advance in the list on the longer lengths.

The discount on flat and round-head stove bolts remains as before, but oven bolts, oval head counter-sunk stove bolts and band bolts, which are special and more costly to make, are quoted at a 10 per cent higher discount.

Flat and Round Head Stove Bolts

List of Nov. 1, 1923. Price per 100.

Length, Inches	¾ Inch	1 Inch	1¼ Inch	1½ Inch	2 Inch	2½ Inch
¾.....	\$0.85	\$0.85	.....	.....	.....	.....
1.....	.85	.85	\$1.20	.....	.....	.....
1¼.....	.85	.85	1.20	.....	.....	.....
1½.....	.85	.85	1.20	\$1.75	\$2.65	.....
2.....	.90	.90	1.25	1.80	2.75	.....
2½.....	.90	.90	1.30	1.85	2.85	\$9.50
3.....	.95	.95	1.35	1.90	2.95	9.50
3½.....	1.00	1.00	1.40	1.95	3.05	9.50
4.....	1.05	1.05	1.45	2.00	3.15	9.50
4½.....	1.10	1.10	1.50	2.05	3.25	9.50
5.....	1.20	1.20	1.60	2.25	3.45	9.80
5½.....	1.30	1.80	1.70	2.45	3.85	10.10
6.....	1.45	1.85	2.60	4.05	10.35	.....
6½.....	1.60	2.00	2.75	4.25	10.65	.....
7.....	1.70	2.10	2.90	4.45	10.90	.....
7½.....	1.80	2.20	3.05	4.65	11.20	.....
8.....	2.00	2.40	3.40	5.15	.....	.....
8½.....	2.20	2.70	3.70	5.65	.....	.....
9.....	2.40	3.00	4.00	6.15	.....	.....
9½.....	2.60	3.30	4.40	6.65	.....	.....
10.....	2.80	3.60	4.80	7.15	.....	.....
10½.....	3.05	3.90	5.20	7.65	.....	.....

For nickel plating add \$1 to list.

Iron Sink Bolts

List of Nov. 1, 1923. Price per 100.

Length.....	1 Inch	1¼ Inches	1½ Inches	1¾ Inches	2 Inches	2¼ Inches
Diameter ¼ in.	\$2.10	\$2.20	\$2.30	\$2.40	\$2.50	\$2.60
Length.....	2½ Inches	2¾ Inches	3 Inches	3½ Inches	4 Inches	.....
Diameter ¼ in.	\$2.70	\$2.80	\$2.90	\$3.10	\$3.30	.....

Cast Iron Pipe from France

The recent award of 4200 tons of cast iron pipe by the Department of Public Service, Los Angeles, Cal., was to the Pacific Pipe & Supply Co. of Los Angeles, as representative of a firm at Port-à-Mousson, France, at the following prices per ton, four meter lengths: 4-in., \$64.16; 6-in., 8-in. and 12-in., \$60.16. Other bids were as follows: National Cast Iron Pipe Co., 4-in., \$65.70; 6-, 8- and 12-in., \$61.70; American Cast Iron Pipe Co., 4-in., \$65.39; 6-, 8- and 12-in., \$61.39; United States Cast Pipe & Foundry Co., 4-in., \$66.14; 6-, 8- and 12-in., \$62.14.

Shipments are to be made direct by the Panama Canal through to Los Angeles.

Three trainloads of products, comprising 150 cars and 6000 tons, were shipped to the Central Texas oil-fields within two weeks by the Petroleum Iron Works Co., Sharon, Pa. The company reports that the tankage included in the first train was fabricated and on the way to Texas three days after receipt of order and arrived five days later.

Proposed Changes in Pig Iron Rates

Animated Hearing at Which Buffalo and Eastern Pennsylvania Producers Differ Sharply—Charge Made That Some Sellers Desire Monopoly

BUFFALO and eastern Pennsylvania pig iron producers were unable to agree on proposed changes in pig iron freight rates to New York and New England rate points at a hearing Wednesday, Oct. 31, at 143 Liberty Street, New York, before the Freight Traffic Managers' Committee, R. N. Collyer, chairman, of the Trunk Line Association.

It was proposed that the eastern Pennsylvania rate be increased from \$3.65 to \$3.90 to Boston rate points, and that the Buffalo rate be reduced from \$4.91 to \$4.90, thus establishing a differential of \$1 a ton in favor of eastern Pennsylvania as against a differential of \$1.26 now existing, which Buffalo producers claim is more in line with the spread which obtained before the percentage increases of the past few years went into effect. The Buffalo producers, Rogers, Brown & Co., the Hanna Furnace Co., Donner Steel Co. and the Wickwire-Spencer Steel Corporation, through their traffic managers, stated that they were willing to have the eastern Pennsylvania rate left undisturbed if the Buffalo rate to Boston points were reduced to \$4.65, which would establish the same spread of \$1 a ton. Representatives of eastern Pennsylvania furnaces strongly opposed any change. The Bethlehem Steel Co., which has furnaces at Buffalo and in eastern Pennsylvania, through its assistant traffic manager, Harry Crawford, proposed a cut in the Buffalo rate to \$4.80, leaving eastern Pennsylvania unchanged, but this was not agreed to by the latter interests.

No Compromise Possible

The Freight Traffic Managers' Committee found at the conclusion of the hearing that no compromise appeared to be possible as between the Buffalo and eastern Pennsylvania furnaces, although both sides were repeatedly urged by the railroad officials to get together on some equitable basis. The hearing was adjourned without action, and it seemed improbable that the trunk line roads would make any move which would meet with disapproval of one side or the other. A possible outcome is an appeal to the Interstate Commerce Commission.

A tentative schedule of new pig iron rates had been prepared by the Freight Traffic Managers' Committee, including not only the rates from Buffalo and eastern Pennsylvania furnaces, but also affecting rates from Pittsburgh and points in that section. While the hearing was called to consider pig iron rates solely, some of the Youngstown interests, engaged in making steel as well as pig iron, attempted to bring into consideration the freight rates on billets, scrap, etc., while those interested in pig iron alone strove to keep the discussion within that channel, leaving billet and scrap rates for separate consideration later, if such should seem to the railroad traffic managers to be advisable.

Proposed Changes

Proposed rate changes were based on an assumed rate of \$8.50 on pig iron from Chicago to New York, and were as follows:

From Pittsburgh to New York rate points, \$5.10; present rate, \$5.42.

From Buffalo to New York rate points, \$4.70; present rate, \$4.91.

From Josephine, Pa., to New York rate points, \$4.90, or 20c. less than the proposed rate from Pittsburgh; present rate, \$5.17.

From Johnstown, Pa., to New York rate points, \$4.80, or 30c. less than the proposed rate from Pittsburgh; present rate, \$5.04.

From Emporium, Pa., to New York rate points, \$4.70, same as proposed from Buffalo; present rate, \$3.78.

(Rates to Philadelphia, Baltimore and points taking the same rates to be constructed on the usual basis with relation to the proposed rates to New York.)

From Pittsburgh to Boston rate points, \$5.50; present rate, \$5.92.

From Buffalo to Boston rate points, \$4.90, or 20c. higher than to New York; present rate, \$4.91.

From eastern Pennsylvania and New Jersey points to Boston rate points, \$3.90, or \$1 per ton less than rate proposed from Buffalo; present rate, \$3.65.

From Dubois and Punxsutawney, Pa., to Boston rate points, \$4.90, same as from Buffalo; present rate, \$4.91.

From Josephine, Pa., to Boston rate points, \$5.30, 20c. under Pittsburgh; present rate, \$5.67.

From Johnstown, Pa., to Boston rate points, \$5.20, 30c. under Pittsburgh; present rate, \$5.54.

From Riddlesburg, Saxon and Earliston, Pa., to Boston rate points, \$4.90, same as from Punxsutawney; present rate, \$4.79.

From Charlotte, N. Y., to Boston points, \$3.90, which makes same advance in present rate as proposed in the rate from eastern Pennsylvania; present rate, \$3.66.

From Emporium, Pa., to Boston points, \$4.90, same as proposed from Buffalo; present rate, \$4.92.

From Port Henry and Standish, N. Y., to points on New York, New Haven & Hartford, south of the line of the Boston & Albany, \$3.90, same as proposed rate from eastern Pennsylvania; present rate, \$3.65.

The Buffalo Position

All of the producing districts affected by these proposed changes were represented at the hearing, each fighting to preserve the relationships now existing with other districts, except in the case of Buffalo, which sought to reestablish rate differentials more favorable to its own furnaces. The arguments of the Buffalo producers were vigorously opposed by several speakers, among them Richard Peters, Jr., Philadelphia, representing the Eastern furnaces as a whole, and N. C. Moon, traffic manager of the Alan Wood Iron & Steel Co., Philadelphia, the largest eastern Pennsylvania pig iron producer excepting Bethlehem Steel Co.

Mr. Moon presented a typewritten statement, which among other things purported to show that the costs of assembling raw materials for making a ton of pig iron are \$12.013 at Swedeland, Pa., as against \$7.558 at Buffalo, a difference in favor of the furnaces located at the latter place of \$4.455 per ton. This was made up as follows:

	At Swedeland	At Buffalo	Difference in Favor of Buffalo
Freight on 2 tons of ore.....	\$7.72	\$3.63	
Freight on 1.1 tons of coke...	3.883	3.608	
Freight on 0.5 ton limestone..	0.41	0.27	
	\$12.013	\$7.558	\$4.455

Representatives of Buffalo producers did not dispute the correctness of these figures as based on consumption of Lake Superior ore by eastern Pennsylvania furnaces, but stated that many of the latter furnaces are using local ores and foreign ores at considerably lower cost per ton of iron than indicated by this tabulation. To this Mr. Moon made answer by showing that the seaboard furnaces are also at a disadvantage because of competition of foreign pig iron. He quoted United States Government figures as showing that 509,162 tons of foreign iron came into this country between September, 1922, and July, 1923, nearly half of this, or 243,105 tons, coming in at the port of Philadelphia. He stated that on Saturday, Oct. 27, a steamer unloaded 3000 tons of foreign iron at Philadelphia for John A. Roebling's Sons Co., Trenton, N. J.

That the contention over freight rates is largely one

of commercial rivalry between the producers of Buffalo and eastern Pennsylvania was indicated by this statement from Mr. Moon's brief:

"If the Buffalo furnaces are finding difficulty in shipping as much pig iron to New England as they might desire, it is not wholly because of the efforts of the eastern Pennsylvania furnaces to share the same markets, nor will an increase in the rate from eastern Pennsylvania afford them the monopoly they apparently seek to gain. It is not the first time that Buffalo has sought to fasten a rate burden on eastern Pennsylvania by complaint similar to that put forth in your [the Freight Traffic Managers' Committee] circular letter. One would think that the furnaces operating where the iron industry had its birth, and that have given the railroads serving them millions of tons of traffic,

have no rights worthy of consideration, when Buffalo takes a look around, suspicious that some one is trampling on its toes.

"If Buffalo is dissatisfied with the tonnage it is able to market in New England territory, so are we, and we believe the high freight rate we are compelled to pay is a deterrent to our shipments into that territory. Facing this condition, the proposal that the rate be increased further is unthinkable and we would use every resource to prevent it. We will oppose any so-called adjustment of these pig iron rates that is not an adjustment downward in the same way that they were adjusted upward. They were put up together and if an adjustment is necessary, they should come down together and in the same relative way they were advanced."

COKING-IN-TRANSIT RATE

Rainey-Wood Coke Co. Makes Plea for Change in Railroad Tariffs, Alleging Discrimination

The Rainey-Wood Coke Co., Philadelphia, owned jointly by the Alan Wood Iron & Steel Co., Philadelphia, and W. J. Rainey, Inc., New York, has filed a bill of complaint with the Public Service Commission of Pennsylvania against the Pennsylvania, Monongahela, Philadelphia & Reading and Upper Marion & Plymouth railroad companies alleging discriminatory freight rates on bituminous coal and coke favoring the beehive coke industry in its competition with by-product coke which the complainant company produces.

The plea of the Rainey-Wood Coke Co. is that the Public Service Commission of Pennsylvania act upon the recommendations of the United States Coal Commission, made in its report of Sept. 20, 1923, that the railroads establish coking-in-transit rates. In this report the following statement was made:

Consideration should be given by the railroads to the establishment of coking-in-transit rates. Coal is coked at the mines in bee-hive ovens, a wasteful process, now giving way to coking in by-product ovens that save the gas, tar, ammonia, benzol and other products. The by-product coking industry has developed rapidly in the past ten years without having coking-in-transit rates and the railroads in their statements to this commission point to that record as evidence that such rates are not essential to the further development of the by-product coke industry. In this way they are unmindful of the fact that the growth thus far has been in connection with the iron and steel industry. The ovens for steel companies are built at the point of consumption of the coke and there has been no question of rates for transportation of the coke beyond.

There is, however, a large and growing field for the growth of this industry in the direction of supplying gas and coke for municipal and household use. This requires that the ovens be located at or near the larger cities. A few such plants have been built. The gas is piped to the consumers, but the coke must be transported by rail. The coal must be carried to the ovens by rail. There is now no relationship between the two rates. The coke from such ovens must compete with bee-hive coke shipped direct from ovens at the mines, or with anthracite. The bee-hive coke and anthracite are carried on through rates. The coal from mines to by-product ovens and coke from these ovens to consumers are carried on two rates (the one on coke usually a high local rate) which, combined, are much higher than a through rate would be.

A coking-in-transit rate would be a competitive through rate by which the coal would be carried from mines to ovens and after conversion to coke, transported beyond to the consumer. Such rates will advance the by-product coking industry and the conservation of natural resources.

There is nothing novel in the proposal of coking-in-transit rates. A parallel situation is found in milling-in-transit rates by which wheat is transported to the mills, converted to flour and several by-products and the flour carried beyond to consumers. The conversion of wheat by milling is of a like character with that involved in the conversion of coal by coking.

It costs the Rainey-Wood Coke Co. \$3.70 to move from the Westmoreland coal district to its plant at

Swedeland, Pa., the 1.4 tons of coal necessary to make one ton of by-product coke. In shipping this ton of coke to Philadelphia there is an additional freight charge of 88c., making the total freight coke for delivery of a ton of by-product coke in Philadelphia \$4.58, or \$1.05 above the \$3.53 rate on which beehive coke may be shipped from the Connellsville district to Philadelphia. The complaint cites many other examples, in some of which the excess of cost on by-product coke over cost of beehive coke, delivered at various points, is alleged to exceed \$2 a ton.

The present rate structure was built up at a time when there was no production of coke in by-product ovens in eastern Pennsylvania, and the relation which then became introduced between freight rates on coal and beehive coke between western and eastern Pennsylvania was entirely without reference, it is stated, to by-product coke production or to the effect such relation might have upon the latter industry and its success and growth. It is claimed that the respondent railroad companies have denied to the complainant "the benefit of facts and circumstances which justly entitle it to a basis of rates and charges affecting its by-product coke operations to enable it to compete reasonably and successfully with the beehive coke industry."

The Rainey-Wood Coke Co. operates 110 ovens and consumes about 800,000 tons of coal annually.

Employment Slightly Less

The number of wage earners in 1678 manufacturing establishments have decreased consistently since April, according to a report prepared by the National Industrial Conference Board, New York. Figures for the same establishments have been compiled for several years. All of the monthly figures for 1923 to date are lower than the figure for the peak month of June, 1920. At that date the number of wage earners was 697,965. In April of this year—the highest month of the year to date—the figure was 643,623. In August, the last month for which reports have been completed, the number was 613,101, a drop of 1½ per cent from the 622,051 in July.

Appointments by Valley Rolling Mills, Inc.

The Valley Rolling Mills, Inc., which recently purchased a bar mill at Elmira, N. Y., has opened executive and sales offices at 120 Broadway, New York, for the sale of its products, which are billets, bars, bands and light angles. Edward F. Quirke, president, and Marcel K. Sessler, vice-president, will be located at the New York address, while John S. Quirke will be in charge of the mills. Appointments of sales representatives have been made as follows: Philadelphia district, William Hoffman, Land Title Building, Philadelphia; Detroit, Miles-Appleby, Garfield Building, Detroit; Pacific Coast, Milton Pray Co., San Francisco.

Open-Hearth Furnace Regenerators*

Proportionate Sizes of Chambers for Air and Gas

—Insulation—Doing Away with the
Gas Regenerators Suggested

BY FRED B. QUIGLEY



FRED B. QUIGLEY was born at Harrisburg, Pa., in 1885 and is a graduate in metallurgy from the Case School of Applied Science, class of 1908. His first employment was at the Ohio works blast furnaces of the Carnegie Steel Co., in the year of his graduation. He was given charge of the Niles furnace in 1912 and held this position until 1922 with the title of assistant superintendent of blast furnaces. At present he is superintendent of the open-hearth and bessemer departments of the Ohio works of the Carnegie company, Youngstown, Ohio, which position he has held since June, 1922.

IN the early days checker chambers were built as part of the foundation of the furnace, which was a poor design. There was always the chance of steel breaking through the bottom of the furnace and filling up the checkers. With the regenerators set to one side of the foundation of the furnace proper, repairs can be made to either without disturbing the other. Another early design used horizontal checkers. This had many disadvantages. The full vertical area of the horizontal checker chamber is not heated evenly, because the gases tend to pass through the upper checker openings to the exclusion of the lower openings, while the incoming air seems to seek a different course, which lowers the possible regenerative efficiency, since the air is not preheated to its maximum extent. Also the horizontal chamber gives no propelling action to the gases, since the only draft effect obtained is from the uptake to the furnace.

The design for modern furnaces uses vertical checker chambers for both gas and air. It has numerous advantages. The hot air rises naturally in the vertical chamber, due to the decreased density caused by the increase in temperature of the air as it rises from the cooler checkers in the bottom rows to the hotter ones on top. This produces a positive pressure to the air which forces it through the port and helps to control the projection of the flame on the bath. This pressure is not so necessary with the gas because it comes from the producers under pressure.

Checker Bricks and Checker Design

There are a number of designs for laying checkers. The following are some of these and the advantages claimed by their inventors. [The Danforth, Orth, Quarrie and other types are described here in detail.]

With the use of pulverized coal for fuel in open-hearth furnaces it has been found that special regenerative construction is necessary, in order to take care of the excessive ash content of the waste gases. When first tried with regular checker block it was found that openings closed rapidly, and as a result the practice today is to use large tile, giving large openings, or some other arrangement using piers or baffle walls. It has also seemed advisable to use removable slag pockets to reduce the amount of ash carried over to the checkers. Some method whereby the ash is deposited before entering checker chambers will assist in the successful use of pulverized coal.

The modern flue arrangement for regenerators pro-

vides for the checker chambers to be built on an angle pointing toward each other, so that the outgoing flues from the checker chambers will be approximately radial to the stack from both chambers, which will also give the easiest flow line and the shortest route for the gases to the stack or waste-heat boilers. (See page 1246.)

Proportionate Size of Chambers for Air and Gas

The Carnegie Steel Co.'s open-hearth committee has decided upon the following as the minimum requirements in regard to size of regenerators for a 100-ton producer gas furnace:

Air Chamber

30 ft. x 12 ft. x 20 ft. deep }
68 cubic feet per ton of steel } Entire chamber
150 square feet of heating surface per ton of steel

Gas Chamber

30 ft. x 8 ft. x 20 ft. deep }
46 cubic feet per ton of steel } Entire chamber
100 square feet of heating surface per ton of steel

The air chamber should be larger than the gas chamber, because the air comes to its chamber cold, while the gas is at a considerable temperature before it gets to the checker chamber and it requires more than one cubic foot of air to burn properly one cubic foot of producer gas. Theoretically the ratio is about 1.3 to 1. To this must be added a slight excess of air. In actual practice the ratio usually runs 1.5 to 1.

Insulated Checker Chambers

In the past, very little attention has been paid to the heat insulation of the checker chambers and the infiltration of air into the checker chambers, due to the stack draft. As has been shown by carefully made heat balances of open-hearth furnaces, there is a large proportion of excess heat in the waste gases entering the checker chambers which cannot possibly be recovered in preheating the air and gas to the furnace. In the case that the waste gases are allowed to pass directly to the stack, the heat insulation of the checker chambers and the flues and the loss in the valves and the infiltration of air is not important, as it makes fairly small difference to the working of the furnace whether the heat is lost by radiation from the checker chambers or in the stack.

However, with the increasing use of waste-heat boilers for recovering the surplus heat in the waste gases, the insulation of the checker chambers and the prevention of infiltration of air become extremely important, and it has been proved in practice that a much larger amount of steam is produced in the waste-heat boilers if the checker chambers are properly heat-insulated and if care is taken to close up openings which allow air to be mixed with the waste gases before entering the waste-heat boilers. In modern installations, care is also taken to design reversing valves in such a way that the heat and draft losses in these are a minimum. With this type of valve there is less infiltration of air through the boiler setting and a greater economy results.

One of the modern methods of insulating checker chambers is to use boiler plate as a barrier on the outside surface, and between this and the brick is placed some heat-insulating material. One plant has had the walls and roof of the checker chambers of two furnaces insulated for over a year with no harmful results to the roof of the chambers.

Life of Checkers

The life of the checker brick is determined to a large degree by the deposits which collect on them, such as lime, dolomite, ore and other oxides. These

*Abstract of paper read Oct. 25 before American Iron and Steel Institute, New York.

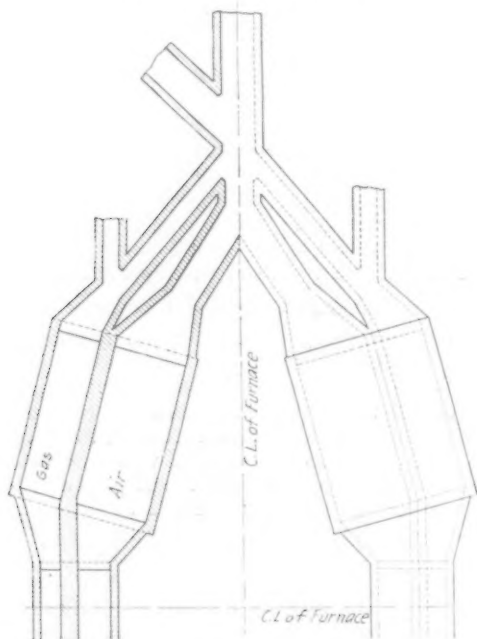
deposits, besides choking up the openings, slag with the brick. Different fuels have different effects on the life of the brick. Natural and coke oven gas are the least damaging, oil and producer gas next, tar next and powdered coal the worst of all. With powdered coal, there is a considerable deposit of coal ash in the checkers, with tar a coke-like substance.

Number of Heats Before Cleaning Checkers	
Fuel	No. of Heats
Natural or coke oven gas.....	300 to 600
Coke oven gas and tar.....	200 to 300
Oil or producer gas.....	200 to 300
Tar.....	175 to 250
Powdered coal.....	75 to 125

For cleaning the checkers, suction has been tried, but was never successful. The best way to clean is with compressed air. After the furnace is taken off the checkers are either soaked with water or allowed to cool gradually. Then as many rows of bricks as are bad are removed and the rest scraped with an iron scraper and blown with compressed air. After the first run on new checkers, very few if any are taken out. On the next run more brick are removed before good bricks are found. Some checkers in the lower rows have been in as long as 1600 heats.

Doing Away with Gas Checkers

Both the papers by Clements, (British) Iron and Steel Institute, May, 1922, and the one by Kinney and



Modern Arrangement of Checker Chambers and Flues

McDermott show by their figures that the gas regenerators in the furnaces they ran their tests in do little work in preheating. This brings up again the possibility of doing away with the gas checkers and insulating the gas flue from the producers to the furnace. If this were possible, there might be opportunity for a better proportioning of the air chamber, having the additional room occupied by the gas chamber. In such a case, there would be an even greater excess of waste heat available, which could be utilized to advantage in waste-heat boilers.

Insulation of checker chambers for best efficiency of checkers has proved advisable, and especially so in the case of waste-heat boilers. It is also possible to gain thermal efficiency by the insulation of the passageway (fantail) from checker chambers to the slag pockets, and this might be extended to the slag pockets as well.

To provide least resistance to the flow of waste gases to the stack or waste-heat boilers, a straight line valve should be used with chambers and flues built radially to the stack and thereby reduce the draft and the tendency to greater infiltration.

In other words, what is desired is a narrow, deep, efficient checker with smaller openings between bricks which can be easily cleaned while the furnace is operat-

ing, a direct passage for the gases to the stack or waste-heat boiler, and a method provided to prevent accumulation of dirt in the checker chambers.

Discussion

Prof. William Trinks, Carnegie Institute of Technology, Pittsburgh, pointed out that Mr. Quigley had assembled data covering all American regenerator designs, and that this is the first time a complete list has been put together. Regarding the placing of regenerators directly under the furnaces, which was formerly current practice, the speaker pointed out that it still is popular practice in steel foundries both in the United States and in Europe. In general, however, the furnace does not rest upon the regenerators as a foundation.

As to the thickness of bricks proper for regenerator use, this depends entirely upon the process, or rather upon the period of reversal. In open-hearth furnace practice, with reversals at 15-in. intervals, the 2-in. thickness is correct, because the 15-min. period permits a penetration of heat to the extent of about 1 in. from each side. For processes, however, in which the period between reversals is longer, a greater thickness may be employed profitably, because with the greater thickness a greater storage capacity for heat becomes available and can be utilized.

As about 10 per cent of the heat units produced by the coal used are lost ordinarily through regenerator walls, both by infiltration of cold air and radiation from the walls, the plan of making air-tight walls by the use of boiler plate or otherwise is recommended, just as boiler settings in modern practice are now made air-tight. Such "iron-clad" regenerators should have explosion doors to relieve the sudden pressure occurring at times, and thus save the checker work from rupture.

Stuart J. Cort, superintendent open-hearth department, Saucon plant, Bethlehem Steel Corporation, pointed out that the fuel cost is from 25 to 30 per cent of the entire conversion cost of producing open-hearth steel. If proper design of regenerators, including their insulation, reduces the fuel consumption of the open-hearth furnace from 650 lb. per ton of ingots to 500 lb., the saving on the production of 45,000,000 tons of ingots per year would amount to 3,000,000 tons of coal per year. He pointed out, however, that insulation of the regenerator walls has its drawbacks because, if the heat be not allowed to escape, the walls are more liable to crumble, this being particularly serious at the skew-back, where two arches of different lengths come together between the gas chamber and the air chamber.

Another point made by this speaker was that practice in the near future is likely to show only one regenerator chamber at each end of the furnace, this being for the air. He pointed out that 14 per cent of the sensible heat in the producer gas, as it enters the furnace, comes from the regenerator brick. To offset this, however, there is a loss approximating 9 per cent due to the decomposition within the regenerator of some of the hydrocarbons in the producer gas. There is a further loss in some installations of as much as 10 per cent, due to the way in which water cooling is practiced. In this case the net loss of heat figures out at 5 per cent, whereas, without the regenerator for the producer gas, this loss would be avoided. Inasmuch as no regenerator is required for natural gas, coke oven gas, blast furnace gas, fuel oil or tar, which are the principal other fuels for this use, the abolishing of the gas regenerator in producer gas outfits would "make it unanimous."

Oxygen from the Air

An attractive loose leaf book issued by M. K. Dunham, 110 South Dearborn Street, Chicago, describes the plant and processes employed in producing oxygen from the air by the "oxeco" liquefaction method. The liquefaction process physically separates oxygen from the air with a consumption, it is claimed, of about one-fifth as much energy as in decomposing water. Illustrations of the equipment as installed in a number of commercial plants are given, together with log sheets, diagrams and various other data covering the subject.

Economics of the Iron Industry in China*

Survey of Ore Deposits and of Producing Capacity of Existing and Projected Plants — Formula Used to Connect Price of Ore with Pig Iron Price

BY CHUNG-YU WANG

INDICATIONS show that the people of the United States have awakened to the idea of the great possibilities of foreign trade in the Far East. The following estimate of ore reserves of the iron deposits so far known in China, suitable to modern blast furnace work as regards type, character and situation (excepting those scattered and unimportant sedimentary deposits found in almost all of the provinces of China, which may amount to 300,000,000 tons and which are adaptable for native furnace work only) shows the quantity to be in the neighborhood of 600,000,000 tons.

As estimated by V. K. Ting, director of the Chinese Geological Survey, the iron ore reserves are as follows in tons:

Provinces	Iron Ore	Theoretical Iron Content
Chili	86,469,000	42,896,000
Fengtien	287,580,000	105,205,000
Shantung	22,920,000	14,138,000
Honan	3,400,000	1,640,000
Anhui	27,500,000	13,525,000
Kiangsi	18,260,000	8,771,000
Hupei	52,687,000	30,095,000
Kiangsu	39,080,000	20,787,800
Fukien	15,000,000	7,000,000
Chekiang	2,300,000	1,050,000
Total tons.....	555,196,000	245,107,800

If we include the 300 million tons of scattered and unimportant sedimentary deposits, we find that China has about one twenty-fifth of the reserves of the world, one-fourth that of America, eight-tenths that of England and one-third that of France or Germany before the war. If the per capita consumption of iron in China were that in the United States, that is 600 lb., as based upon pre-war production, we would have to face the consequence of exhausting the 900 million tons of ore in about four years.

Annual production of pig iron by the modern furnaces in China will soon reach the 1,000,000 ton mark, if the iron market continues to improve and if the concrete proposals that have been made soon materialize. The following is a list of iron works existing or proposed, with their maximum production and their present production in tons:

Name of Company	Locality of Furnace	Maximum Annual Production	Estimated Production for 1923
Han-Yeh-Ping Co.....	Hanyang	216,000	100,000
Han-Yeh-Ping Co.....	Tayeh	324,000	90,000
Liu-Ho-Kou Mining Co.....	Hankow	36,000	30,000
Pen Hsi Hu Coal & Iron Co.....	Pen Hsi Hu, South Manchuria	91,000	20,000
Lung Yen Co.....	Western Hills, Peking	90,000	.....
Kai Lan Mining Administration	Ching Wan Tao	90,000	.....
Anshanchan	Mukden	100,000	20,000
		947,000	260,000

It is well known that pig iron is still produced in small native furnaces in nearly all of the provinces of China. An estimate of the approximate production of ore and native pig for the year 1915 gives 499,810 tons for the former and 108,330 tons for the latter. The table below shows the chemical composition (in per cent) of the pig iron produced in the various works.

*Abstract of paper read Oct. 25 before American Iron and Steel Institute, New York.

Cost of mining iron ore in China varies according to location and type of ore deposit. Let us take the Tayeh iron mine as a representative type of mining on a large scale. The cost of mining and transportation (about 28 km. or 17 miles from the mine to port of shipment) was about \$1.00 Mex.* per ton in 1913, itemized as follows:

	Taels
Salary	0.154
Labor and material.....	0.241
Transportation	0.074
Loading	0.112
Miscellaneous	0.143
Total	0.724—approximately \$1.00 Mex.

* \$1.00 Gold = \$2.00 Mex. = Taels 1.45.

In 1919, due to rise in cost of material and labor and including interest and depreciation, the cost per ton at port of shipment was \$2.80 Mex. I presume the present cost varies slightly around this figure. The cost of mining in the various small and scattered deposits in Hunan, to supply ore to the native furnaces, varied from \$0.672 Mex. up to \$3.36 Mex. per ton.

It will be interesting to you to know the conditions under which contracts for ore delivery have been made in China. Japan has been the largest buyer of Chinese iron ore, the quantities ranging from 300,000 tons to 600,000 tons per year. Under the terms of an agreement with the Han-Yeh-Ping Co., involving a series of long term loans from Japan, there are specified the following restrictions as to the grade of ore to be delivered, f.o.b. steamer at Tayeh at \$3 (Mex.) per ton, with 5 per cent additional for shortage:

Iron content based at 65 per cent; for every increase of 1 per cent, a premium of 10 c. Mex. is given; for every decrease of 1 per cent, a deduction of 10c. Mex.; refusal, if 50 per cent or less. Manganese content based at 0.5 per cent; for every additional 0.1 per cent, a premium of 10c. Phosphorus, at 0.05 per cent; for each decrease of 0.01 per cent, a premium of 10c.; for each increase of 0.01 per cent, a deduction of 10c.; refusal, if more than 0.08 per cent. Sulphur, 0.1 per cent; for each additional 0.1 per cent, a deduction of 5c.; refusal, if more than 0.5 per cent. Copper, 0.4 per cent; refusal if more than 0.4 per cent. The average sizes of ore should be between 75 mm. (3 in.) and 150 mm. (6 in.); and any sizes less than 25 mm. (1 in.) are rejected.

Recently an agreement has been concluded between the Hupei Government Mining Bureau, operating the Elephant Nose iron mines at Tayeh, and the Liu Ho Kou Mining Co., operating the Yangtse blast furnace, for the supply of between 60,000 tons and 70,000 tons of ore at \$3.60 (Mex.) f.o.b. lighters at Tayeh, under the following terms as to the quality of ore supplied:

Iron content based on 60 per cent to 62 per cent; for every 1 per cent above 62 per cent, an increase of 10c.; for every 1 per cent below 60 per cent, a deduction of 10c.; refusal, if below 50 per cent. Manganese, 0.5 per cent; for every 1 per cent above 0.5 per cent an increase of 10c. Silica, up to 10 per cent; for every 1 per cent above 10 per cent, a deduction of 5c.; refusal, if above 20 per cent. Phosphorus 0.05 per cent; for every increase of 0.01 per cent, a deduction of 10c.; for every decrease of 0.01 per cent, a premium of 10c.; refusal, if above 0.1 per cent. Sulphur, 0.1 per cent; for every increase of 0.1 per cent, a deduction of 5c.; refusal, if above 0.5 per cent. Copper, 0.2 per cent; refusal, if above 0.2 per cent. The weight of the ore delivered is calculated on the dry basis, with 2½ per cent additional for shortage.

In this connection, the following empirical formula, which has been developed by me, has been accepted in

Name of Company	Si	S	P	Mn
Yangtze Foundry Pig No. 1 (Liu-Ho-Kou Co.).....	2.50 to 3.00	0.03 Max.	0.05 to 0.15	0.5 to 0.7
Han-Yeh-Ping Co., No. 1.....	2.0 to 4.0	0.03 to 0.08	0.25 to 0.33	0.60 to 2.00
Pen-Hsi-Hu, No. 1.....	.....	0.012 to 0.047	0.07	0.40

principle by the Bureau of Mines for the settlement of the price paid for the ore delivered this year.

Let x = price of pig iron when the original contract was signed.
 y = price of ore, agreed upon when the contract was signed.
 z = price of pig iron (local market) when readjustment of price of ore is made.
 w = a constant.
 A = price of ore in \$ Mex. delivered f.o.b. Tayeh at the time when the yearly readjustment is made.

$$A = y - \frac{z - y}{x} w$$

In this case x = Taels 70, being the local price of pig iron in 1919 when the agreement was signed: y = \$4.10, being the price agreed upon at that time: z = Taels 35, being the price of pig iron at the beginning of this year: w = 4, arbitrarily fixed, since the cost of ore for one ton of pig iron is about $\frac{1}{4}$ of the total cost of smelting.

$$A = 4.10 - \frac{35}{70} \times 4.10$$

= \$ 3.588 (Mex.) say \$3.60, which is the ruling price for ore finally agreed upon for this year.

Cost of Iron Manufacture in China

Cost is a thing very fluid, and is not easy to hold for any length of time. Its usefulness lies in giving us a comparison and in the forecasting of future costs. The following table gives at a glance the cost of iron manufacture in China, as compared with that in the United States all in American dollars:

Raw Materials	Liu-Ho-Kou Mining Co. (Yangtze furnace)				United States 1923
	Tons	1923	1920	1921	
Iron ore.....	\$1.61	\$3.94	\$3.33	....	\$9.50
Manganese ore..	0.02	0.14	0.33	....	1.25
Limestone	0.40	0.32	0.46	....	1.50
Coke	1.11	10.76	13.46	....	10.25
Scrap .....	....	....	0.18	....	....
Total		\$15.16	\$17.76	\$14.83	\$21.25
Labor		\$0.55	\$0.28	\$1.26	\$1.75
Supplies and stores..		0.30	0.12	....	....
Repairs and maintenance		0.28	0.19	1.29	2.00
Replacement of tools..		0.03	0.36	....	....
General expenses.....		2.60	0.96	3.82	....
Financial expenses.....		2.80	3.60	....	....
Power .....		....	0.62	1.28	....
Total		\$21.72	\$23.89	\$22.48	\$25.00

The number of man-hours per ton of pig iron at the Yangtze blast furnace is on an average about 17, as against between 1.72 and 6.2 in the United States, although the labor cost per ton of pig iron is cheaper in China. This points to a moral: cheap labor is always inefficient. Let us examine the assembling cost of raw materials per ton of pig:

	Yangtze blast furnace, 1923	Valley furnace (U. S. A.), 1920
Coke	\$3.64	\$2.77
Limestone	0.18	0.42
Ore	1.04	6.47
Supplies .....	....	0.50
Taxes .....	....	0.31
Total	\$4.86	\$10.47

Under existing conditions China cannot consume more than 100,000 tons of modern furnace pig iron and so the excess of production has to depend upon the Japanese market, which, in fact, indirectly controls the local Chinese market. The price has grown more and more shaky every day. Since the cutting down of prices by the Han-Yeh-Ping Co. a few months ago, even the price of Taels 33.00 fails to interest any buyer at Hankow. Buyers are adopting a "watchful waiting" policy. The same condition prevails in Shanghai, where buyers are not eager to place orders at Taels 36.00.

The 1922 lumber production in the United States amounted to 31,426,922,000 board feet, according to the Census Bureau, in cooperation with the Forestry Service of the Department of Agriculture. This represents an increase of 16.5 per cent over the production of 1921, which was 26,960,864,000 board feet.

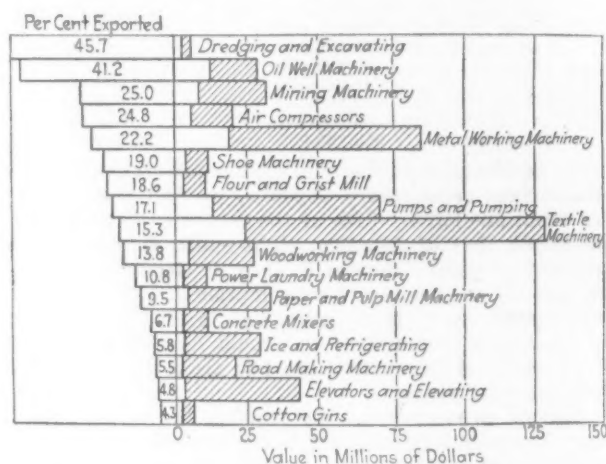
EXPORTS VERSUS PRODUCTION

Comparison on Percentage Basis of Leading Lines of Machinery

Figures prepared by W. H. Rastall, chief of industrial machinery division, Department of Commerce, show in an interesting way the proportion of the American production of certain classes of machinery which entered into our exports. In particular, the largest item of export was dredging and excavating machinery, with 45.7 per cent of the total produced. One of the smallest items consisted of cotton gins, with only 4.3 per cent exported. The diagram, arranged in order of percentage exported, shows clearly the status of the several products covered.

In his analysis, Mr. Rastall points out that before the war Germany furnished perhaps 45 per cent of the machinery which went into international trade, and that since the armistice there have been brief periods when the depreciated condition of the mark, combined with other conditions, gave German manufacturers a peculiar advantage—an advantage which now does not exist.

American engineering and American machinery are distinguished in the world's markets for their superiority. Americans are noted for their engineering achievements but, because of this superiority, American machinery is usually higher in price than similar equipment secured from foreign sources. It must be



Machinery Exports from United States Arranged in Order of Percentage of the Total Production Which Is Exported. Quantities, at right, show exports in white and total production in total length of "band"

marketed on a quality rather than a price basis. Hence this trade that formerly went to Germany will now pass to British manufacturers, unless American products are supported by constructive sales effort of such character as to demonstrate that American equipment is worth the price asked—and more.

Export business is becoming more and more essential to the prosperity of the individual manufacturer. The chart shows that it is vital for manufacturers of dredging and excavating machinery. The difference between a satisfactory and an unsatisfactory export ratio can easily represent the difference between profit and loss on the year's balance sheet. Manufacturers have a definite opportunity to improve their export ratio, and the present international situation provides an unusual opportunity.

The Interstate Commerce Commission last Saturday announced the granting of the application of railroads to establish rates on manganese ore and manganese ore concentrates from Denver and other points in Colorado to Duluth, Minn., Chicago, and Peoria, Ill., and points taking the same rates, dependent upon the value declared in writing by the shipper or agreed upon in writing as the released value of the property.

Acid Electric Steel Castings

Cardinal Points in Good Practice—Scrap and Making Bottom— Charging and Melting Down—High Carbon and Chrome Steel

BY LARRY J. BARTON*

THE acid electric furnace process has become so important from a commercial standpoint that it deserves the closest consideration. The common idea is that the process is so simple that a green man, in a few heats, can become a melter. This has resulted in the springing up of many "first class electric melters," but has not placed the operation on as high a plane as it deserves.

From a rather broad experience, covering nearly all phases of the electric furnace iron and steel business, it is the writer's opinion that as much skill is required to make good, regular acid steel, as to make metal by the basic process. If anything, it is much harder to obtain absolute control of acid metal, as any one knows who has been held to close specifications.

With this idea in mind, this article is written, not to

but a closely packed charge will always melt better and quicker than one loosely placed in the furnace. Dirty or rusty scrap will always melt lower in carbon, manganese and silicon, than one of clean metal, which is very apt to disturb regular analysis.

Therefore, in making up the charges for the furnace, approximately the same conditions should be had for every heat. This will account for the following points:

1. Will phosphorus and sulphur be within limit? If well down, it is often possible to use a small amount of cheaper, basic scrap, but this is not recommended.
2. The proportion of light to heavy scrap should be about the same for each charge.
3. The physical condition of the charge should be regular as regards percentage of clean scrap, medium scrap, and dirty scrap.
4. The chemical proportions of carbon, silicon, and manganese should be kept closely the same.

If these points are adhered to, it follows that the bath, when melted, will in almost every case be of about the same composition, and will require very little "working" to bring it to the point of finishing heat. That the elimination of any extra handling means economy of operation requires no argument.

There are many excellent methods of storing and handling scrap material in use today, and while it may cost a little more to keep the scrap segregated, it surely pays in the end.

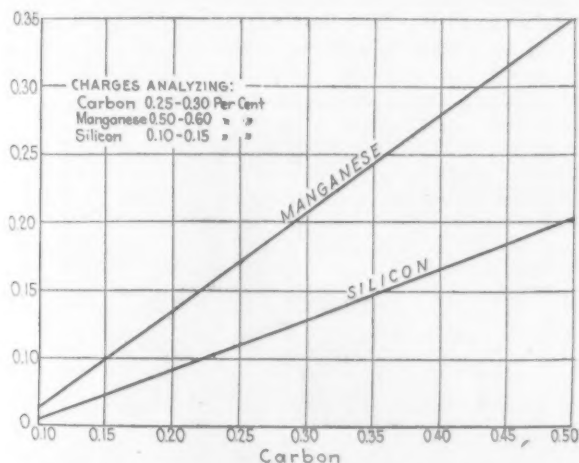
Making Bottom

There are two fundamental methods of making the acid hearth—that of burning in bit by bit, and that of ramming all at one time.

Burning in: To make a bottom in this manner, the furnace shell is first lined on the bottom with several courses of good clay or silica brick. Electrodes are then set in the bottom, as in the basic process, and the arc is struck. When the furnace gets up to the point where the bottom brick begin to glaze, sand or ganister is shoveled in and gradually built up to the desired shape. While this makes an excellent hearth, it has certain disadvantages in that it severely strains the roof and side walls, uses considerable current, and is a long heart-breaking job. Secondly, it does not seem, by actual experience, to give any better results than a rammed bottom.

Ramming: As many courses of good clay brick as desired are laid on the bottom. I have found two courses, laid flat, to give good satisfaction. The mixture to be rammed is then made up. The best way of making this is in a small-sized sand mixer, making up an amount equivalent to not over six wheelbarrows at a time. If such equipment is not handy, the mixture can be readily made by hand on a smooth plate or in a plain mud box. This mixture should be of good refractory character, with enough binder to enable it to be well rammed, and of such a character that it will set in one monolithic mass when thoroughly dried and baked. Some prefer to use sand, some ganister, and some crushed silica brick. For a binder, there are many substances: Pitch, tar, molasses, glutrin, etc.

There is one special mixture which is strongly recommended as giving superior service to any which the writer has tried. This is a mixture of 100 per cent ganister mixed with hytempite. The ganister is mixed of about 50 per cent which has passed a $\frac{1}{4}$ -in. mesh, and 50 per cent which has passed a $\frac{1}{2}$ -in. mesh. This allows a mixture which will pack readily and will hold up well. Hytempite is mixed with water to a very thin consistency—about like cream—and added to the ganis-



Approximate Percentages of Residual Manganese and Silicon in Baths of Acid Steel Melting Down in Carbon Contents

be offered as a text but to give, in detail, the handling of this process as practiced under the writer's direction.

Scrap to Be Used

As the acid process does not in any way eliminate phosphorus or sulphur, scrap metal low in these elements must be used for the charge. The present allowable limits for steel castings are: 0.06 per cent phosphorus and sulphur content respectively. There are many good classes of scrap on the market, which will meet these specifications with ease. Practically any scrap coming from the basic open-hearth furnace will prove suitable. Boiler plate, structural steel, forge flashings, heavy borings, etc., are excellent.

Each car of scrap, as it comes into the plant, should be carefully examined and then segregated. This segregation will take account of several points:

1. The phosphorus and sulphur content of the scrap.
2. The carbon content.
3. Size of pieces.
4. Condition of scrap, as regards rust, etc.

This is very important if regular operations are mandatory, as any material change in the charge will necessarily change the final product. As it is not economical either to boil with ore to eliminate carbon, or add pig to recarbonize, the analysis of each charge should remain as closely the same as possible. In the same manner, a charge of all light scrap will oxidize more than a charge of heavy chunks. Not only that,

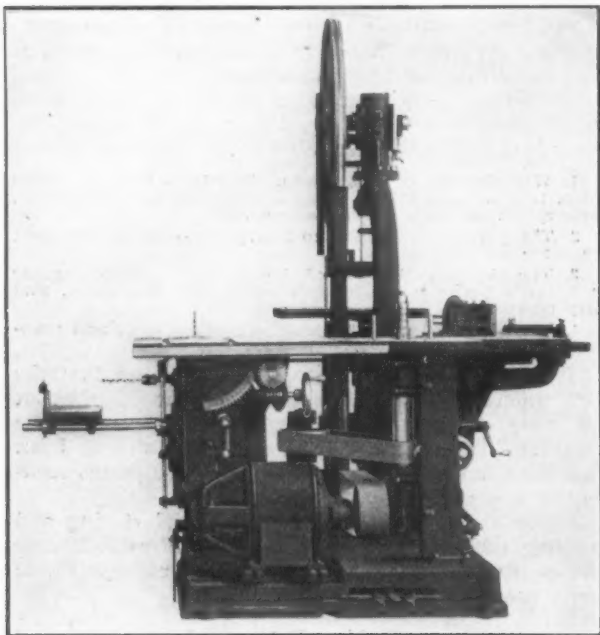
*Box 490, New Orleans, La.

(Continued on page 1299)

Improved Wood-Working Machine

The universal wood worker, Nos. 101 to 112, of the Crescent Machine Co., Leetonia, Ohio, has been redesigned, provision for more convenient operation and wider range of capacity being features of the new machine. The previous design was illustrated in THE IRON AGE of June 11, 1914.

The saw table is now entirely separate from the shaper, and the borer is placed independently of the saw table. The top of the saw table raises and lowers to permit of cutting through various thicknesses of material, and may be tilted to an angle of 45 deg. by



Universal Wood Working Machine Made Up of Five Units. Each unit has individual control and all may be in operation simultaneously

means of a handwheel and worm gear tilting device. A scale and pointer indicate the degree of angle.

The machine is made up of five separate units, a band saw, a jointer, a saw table with tilting top, a shaper and a borer. Each unit has individual means for starting and stopping and all five units may be in use at one time, each operator having complete control of his machine and being free from interference by the other operators. Endless belts driving each unit are located within the machine so that they do not interfere. The starting and stopping of each unit, except the shaper, is by means of a belt-tightening pulley operated by a lever. The tightening pulleys may be adjusted for maintaining proper tension. Belts do not run unless the units are in operation. The shaper is started, stopped and reversed by means of friction cones, the lever controlling this mechanism being easily operated by foot. All sliding adjustments are gibbed to take up wear.

The base is a single casting cored-out hollow and provided with reinforcing ribs. It sets flat on the floor, an arrangement intended to give more substantial support than otherwise obtainable. The several units making up the machine are mounted on cast-iron, cored-out hollow pedestals, accurately machined and bolted to the base on machined surfaces. A new feature is that a special motor base is not required, the regular base being designed so that the motor may be conveniently attached. Universally adjustable slide rails for the motor are provided as regular equipment.

The No. 101 machine has an 8-in. jointer, 26-in. band saw, and reversible shaper. It occupies floor space of 77 x 81 in., is 78 in. high and weighs 2330 lb. net. The power required is from 5 to 7 hp.

A new 2500-ton per week blast furnace is about to be blown in by Dorman, Long & Co., near Middlesbrough, England.

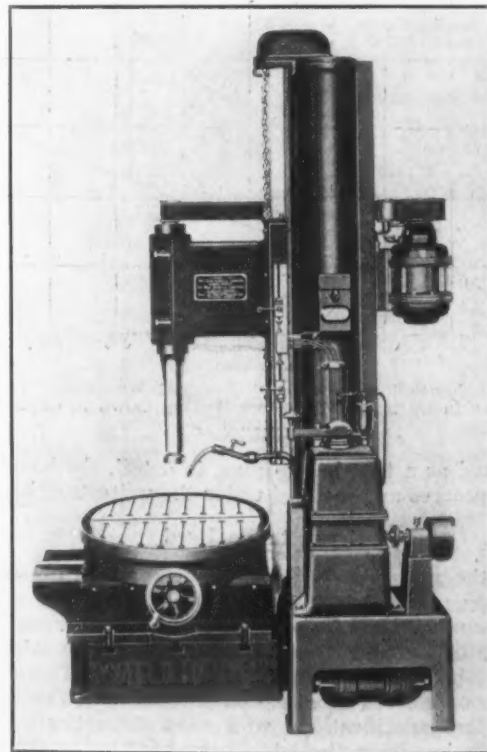
Vertical Internal Grinder

New features have been incorporated in the model L-R Williams vertical internal grinder which is being marketed by the Hy-Way Service Co., Elkhart, Ind. The machine is equipped with a revolving table, as shown in the illustration, and the motor is arranged to counterbalance the overhang of the head, which is claimed to minimize friction and wear in the ways.

The wheel spindle regularly provided grinds holes from 3½ to 20 in. The width of the driving belt is 2½ in. and the spindle speed 7000 r.p.m. The arbor is 3½ in. in diameter, tapering to 3 in., and is 15 in. long. Arbors 18 and 24 in. in length are also available. The feed of the head ranges from 0 to ⅝ in. per revolution of work, and quick traverse is provided to and from the work.

The wheel spindle is driven by a 2 hp. vertical type 3400 r.p.m. motor, which is mounted directly at the rear of the head and travels with it. The revolving table is driven by a ¼ hp. motor having three speeds, 600, 1200 and 1800 r.p.m. This motor is mounted on the left side of the table, and starting, stopping and changing of speeds is controlled by a drum type controller located on the opposite side of the table. A hydraulic oil pump 1 hp. 1700 r.p.m. motor mounted on a separate stand also drives the water pump.

The vertical travel of the head is 28 in. and the distance from the center of the arbor to the apron on the ways is 15 in. The in and out travel of the revolving table is 12 in. The finished top of the table is 24 in. and the outward travel of the table 12 in. The



Vertical Internal Grinding Machine. The motor is arranged to counterbalance overhang of the head

floor space occupied is 42 x 49 in. and the height 7 ft. 6 in. The weight of the machine crated is approximately 5500 lb.

It is estimated by the National Industrial Conference Board that 200,000 new leaders will be required by American business in the next seven years. This includes technically trained men for various managerial positions, as well as leading executives. To fill these positions it is estimated that there are at present in technical schools only about 50,000 students. Hence, it is argued by the board that there is going to be a shortage of men for positions of responsibility.

INVESTIGATING MERGER

Interesting Testimony Presented at Hearing in Regard to Merger of Other Companies with Bethlehem

BOSTON, Nov. 5.—Hearings on a complaint of the Federal Trade Commission charging that the merger of the Bethlehem, Lackawanna, Cambria and Midvale steel companies is in violation of the Federal trade act, were started Oct. 31 in the Federal Building, Boston, and continued this week. They will be continued, according to present plans, in Buffalo and possibly New York. Attorneys Baldwin B. Bane, Edward L. Smith and Roger E. Barnes represent the Government at the hearings, while the Bethlehem Steel Corporation is represented by Attorneys Hoyt A. Moore and W. W. Robertson, of Cravath, Henderson and de Garsdork, New York. Examiner George McCorkle is conducting the Boston hearings.

Questions put by attorneys for the Government were for the purpose of showing, if possible, that the withdrawal of the Midvale, Cambria and Lackawanna companies may be an act in restraint of trade, may have resulted in unfair competition, and may have reduced the available supply of steel mill products. It was brought out during the hearings by the witnesses on various occasions that the supply of steel had not been reduced by the merger of the above companies with the Bethlehem Steel Corporation. Also, that competition is confined to fewer companies. It was testified as well that the Bethlehem Steel Corporation is much more active in the New England field than heretofore. The question of price as it relates to competition now and before the merger of the companies was gone into thoroughly, as well as terms on which contracts for steel are made. A surprisingly large number of witnesses maintained that the price at which steel is purchased is not as much of a factor with consumers as is delivery.

Adds to Line of Heavy Duty Lathes

The R. K. Le Blond Machine Tool Co., Cincinnati, has added to its line of heavy-duty geared-head engine lathes 30-in. and 36-in. machines, the latter being shown in the accompanying illustration. In design the larger lathes are similar to the smaller machines described in THE IRON AGE of Dec. 28, 1922.

The headstock is oiled automatically, lubricant being

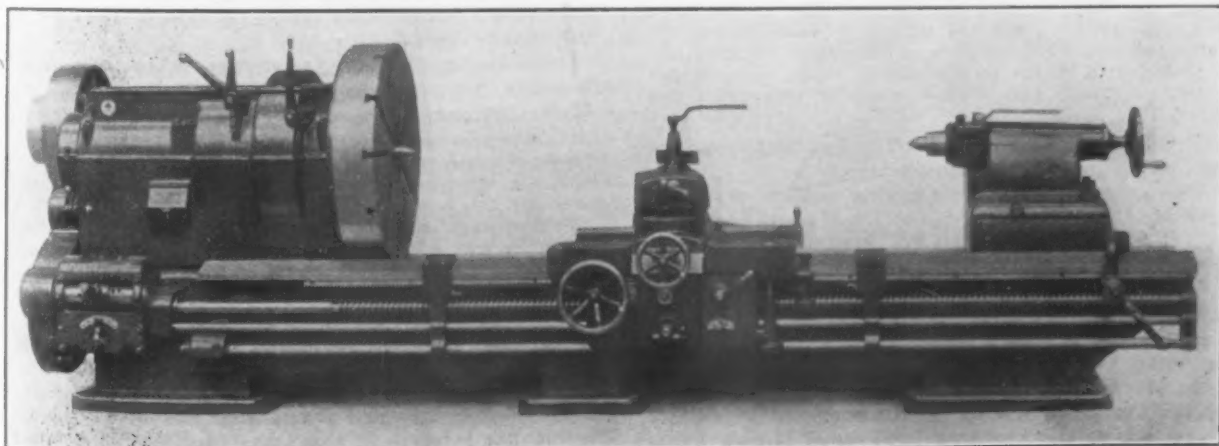
In regard to mills offering to carry accounts longer than 30 days, it was shown that all steel mills have made it a practice to give 30-day extensions when requested to do so. Questions as to competition among steel companies for New England business prior to the Midvale-Cambria-Lackawanna-Bethlehem combination, brought out the statement from one witness that the leaders of the downward price movement of 1921 were first the Cambria, second the Carnegie, and third the Lackawanna companies. Considerable opposition was expressed to the Pittsburgh base pricing on mill products.

Testimony was presented by some witnesses to the effect that deliveries could be improved upon, but the question remained open as to whether the fault rested upon the railroads or the mills due to a congestion of business. Much stress was placed by certain witnesses on the importance of quality of steel in making purchases, this factor rather than price being the determining one.

Approximately 30 witnesses will have been examined before the close of the hearings at Boston. Those already examined include: William C. Smith, treasurer Boston Forge Co., Boston; Fred F. Stockwell, president Barbour, Stockwell Co., Cambridge, Mass., street railway supplies; Carl Stahleker, manager steel department Brown-Wales Co., Boston; Phillip Stanton, Sexton Can Co., Everett, Mass.; Homer B. Belfield, purchasing agent Billings & Spencer Co., Hartford, Conn., drop forgings; Robert C. Loughlin, general manager Thomas Loughlin & Co., Portland, Me., marine hardware; William C. Tobin, vice-president Rogers Drop Forging Co., Worcester, Mass.; Herbert A. Sanderson, purchasing agent Wasson Mfg. Co., Springfield, Mass., railway equipment; J. L. Burke, Bath Iron Works, Bath, Me., shipbuilder; Albert I. Fields, Simonds Mfg. Co., Fitchburg, Mass., saws, files, etc.; E. W. Christ, vice-president Stanley Works, New Britain, Conn., hardware; John M. Collins, Moore Drop Forge Co., Springfield, Mass.; and Fred M. Chipman, International Engineering Works, Framingham, Mass.

The driving pulley runs at 500 r.p.m. The spindle is of 0.50 carbon crucible steel forging and has replaceable, heavy bronze, babbitt-line bearings which are automatically oiled. The spindle may be started and stopped from the apron or headstock.

The bed is deep and heavy and the rear carriage bearing is flat. The front shear is of the company's improved compensating Vee type, which is claimed to resist tool pressure in all directions and greatly in-



Heavy Duty Single Pulley Drive Geared Head Engine Lathe. Massive construction and convenience of control are features. Sixteen speeds and 48 threads and feeds are available

pumped to all bearings and gears running in oil bath. Sixteen spindle speeds, from 4 to 255 r.p.m., are available, speed changes being made by means of two levers. Gears are of steel and heat treated, the sliding gears are of chrome nickel alloy, heat treated and hardened, and have stub form teeth. Multiple keyways in the gears are broached from the solid, and shafts have multiple hobbled splines.

crease the stiffness of the lathe. The bed and carriage are of semi-steel. The apron is a rectangular box in which all the bearings for shafts and screw are cast integral with the apron. All shafts have bearings in both walls of the apron. Both feeds are operated by a single positive clutch, and cross and length feed and screw cutting are interlocked.

The quick change gear mechanism is of unit con-

struction and all gears are of steel and have special heavy tooth section. All changes are made with two levers. A separate feed rod is provided for driving feeds and the lead screw is not splined. Special coarse leads or metric threads can be cut by applying gears to the end of the box. Forty-eight threads and feeds are available.

The 36-in. lathe illustrated swings 38½ in. over the

shears, 29 in. over the carriage and 26½ in. over the compound rest. The distance between centers, 12 ft. bed, is 4 ft. 7 in. The driving pulley is 24 in. in diameter, and width of belt 6 in. The spindle has a 2¼ in. hole and No. 6 Morse centers are used. The motor recommended is of 15 to 25 hp. running at 1750 r.p.m. The shipping weight of the 36 in. lathe with 12 ft. bed is 16,200 lb.

PHYSICS OF CAST IRON

Chemical Composition Advocated as Recommended Practice—Further Light on the Subject

The problem of the physics of cast iron, particularly the use of chemical specifications, has been a prominent subject for some time. It was brought up some years ago by William R. Webster, Philadelphia, and has been debated frequently at various sessions of the American Society for Testing Materials and of the American Institute of Mining and Metallurgical Engineers.

In a recent progress report of committee A-3 on cast iron of the American Society for Testing Materials, some recommendations on this subject were made which are of considerable interest. The following extract reveals the opinion of the committee on this subject:

During the past year, the adaptability of the tentative specifications for pig iron for the steel and the malleable foundry, in addition to the iron foundry proper, have been studied and suitable changes and rearrangements are being made which appear to cover the situation properly. In spite of the experience of foundrymen to the contrary, there is a persistent call from consumers of castings for definite compositions for given lines of castings. To respond to this call for information desired by the consumer—information every modern foundryman should have and guide his procedure with—the committee has requested the sub-committee on general castings to take up this matter with a view of constructing tables of analysis ranges for important lines of foundry product. These analysis ranges, however, are to be given as "recommended practice" and not intended for actual specification. In this way, the consumer of the foundry product will get the information he wants; the furnaceman will be guided in the production of his pig irons to prepare for analysis ranges which are more closely standardized and have less of "freak" requirements made by inexperienced metallurgists; and the foundryman will not be bound by chemical requirements he knows will not work out well with his particular regional supplies of melting stock. It is intended to call attention to this work of the sub-committee on standard ranges of analysis of castings in a preamble to the pig iron specifications, so that the specifications themselves are not burdened with such data. It may be stated parenthetically that the specifications for pig iron, as promulgated by the society, are in reality only a guide to the systematic and modern ways of purchasing this material.

It will be noted that this is offered as "recommended practice" and not actual specifications.

The salient points in this long controversy were briefly and concisely discussed by Dr. Richard Moldenke in a "Note on a Scheme for the Study of the Physics of Cast Iron," published as an appendix to the A. S. T. M. tentative specifications and a discussion on the physics of cast iron by William R. Webster, for presentation at the February, 1923, meeting of the mining engineers. Dr. Moldenke's note is reproduced below:

In March, 1895, William R. Webster contributed a carefully prepared scheme for the study of the physics of cast iron to the American Institute of Mining Engineers at its Florida meeting. This summary of the interrelation of the chemical and physical characteristics of cast iron with the operations of daily foundry practice caused a wide discussion of the then little understood though universally used material. Mr. Webster has requested the author to bring the subject up to date, and while glad to comply, it must be said that with all the knowledge that has been gained in the quarter century that has passed since the subject was brought to the attention of the institute—and we now are pretty familiar with cast iron in all its aspects—there is practically nothing to change and little to

add to the facts as given by Mr. Webster originally, and in the discussions.

The suggested lines for discussion and investigation as they would appear at the present time are as follows:

I. Relation between chemical composition and physical properties, such as fusibility, fluidity, set, contraction, chill, hardness, strength, specific gravity, etc.

II. Influence of variations in foundry practice upon chemical composition and physical properties, as in the following summary:

Mixture Characteristics:

Pig and scrap proportions, steel additions, charcoal or coke irons, "direct" blast furnace metal.

Metals' Characteristics:

Clean or with sand, rust, burnt scrap, shot, borings, salamanders and heavy section pieces.

Melting Characteristics:

Rational or poor charging and melting practice in cupola or furnace, normal hot iron or oxidized "lifeless" quick-setting metal. Duplexing in electric furnace for better super-heat, deoxidation and desulfurization.

Temperature Characteristics:

Pouring temperature and rate of cooling due to mold surface characteristics, whether green or dry sand, metal molds, use of chills, section of castings, refractory quality of mold, gating of molds.

Molecular Treatments:

Annealing, seasoning, rumbling, repetition, heating and cooling.

Effect on

Grain structure.
Internal shrinkage, porosity.
Blowholes.
Hardness.
Strength.
Internal stress.
Carbon condition.
Changes in other contained elements.
Effect on

The following bad characteristics in castings are sufficiently important to warrant special mention in separate paragraphs:

III. *Shrinkage and Segregation*: As specially affected by composition, oxidized metal through bad melting practice, cold metal, irrational gating methods, insufficient feeding opportunity, low ferrostatic pressure.

IV. *Blowholes*: As specially affected by oxidized ("burnt") metal in charges or through bad melting practice, cold iron, low ferrostatic pressure, wet mold surfaces, wet or insufficiently vented cores.

While the scheme for study as outlined in 1895 differs but little from the one above given, the conditions obtaining in foundry practice today are, nevertheless, vastly improved. Buying pig iron by its analysis is the rule everywhere and fracture is seldom an issue. The foundry foreman of today has no difficulty in calculating his mixtures chemically, and the compositions of the various types of castings are almost standardized. Melting practice has now been placed upon a scientific basis in the foundry, so that there is little excuse for heavy losses from inferior metal. There still remains, however, a critical study of the principles and practice connected with the rational gating of molds.

A discussion of every point included in the above scheme of study would assume the bulkiness of a book, and hence no attempt will be made in that direction. The summary of a life's work in the production of good

castings—necessarily interwoven with the chemical and physical characteristics of cast iron—is as follows:

1. Use the best materials suited to the production of the castings wanted.
2. Employ correct melting, molding and finishing process.
3. Gate the molds correctly, so that the good materials, properly manipulated, may be given the best chance possible to produce good work.

It was through the active work of the American Institute of Mining Engineers in the study of pig iron that the change was brought about from the purchase of pig iron by its fracture to its classification and purchase by its chemical composition. That work was taken up by the committee on cast iron of the American Society for Testing Materials, who brought into general use their specifications governing the grading and purchase of pig iron.

The present condition of the pig iron situation is about the same as the status of steel when the change was made from iron to the use of steel for structural purposes. At that time every engineer desired to have his name on his specifications. Since then the whole matter has been cleared up and we now have standard specifications which are in general use. These results were brought about by giving the producers and the consumers equal representation and vote on the com-

mittees preparing these specifications. This same plan can be followed to great advantage in pig iron. Under the present conditions the requirements of the founders sent to the blast furnace men are not uniform even when they are making the same grade and weight of castings and many requirements are "hair splitting," which entails unnecessary trouble to all parties. The natural solution of the present condition is to collect the requirements under which pig iron has been sold for each of the grades of castings, manufactured malleable iron, acid open-hearth steel, basic open-hearth steel, etc., the work to be done by a committee having an equal representation of blast furnace men, whom we term the producers, and the consumers who manufacture the finished product. The requirements to insure reliability of their finished product have already been put into use and need not be further considered.

If this course is followed out, then it would enable any blast furnace in the country to produce a much larger output on a given grade of pig iron than ever before, as the number of grades would be reduced and the hair-splitting requirements removed. In dull times this would enable the furnaces to stock up considerable of each grade of iron with much more certainty than under the present conditions.

New Methods of Preventing Corrosion of Steel

More Effective Protection from Putting Chromium Salt Solutions in Emulsions, Oil Paints and Concrete—Results of French Investigations

THERE is naturally great interest in methods that will prevent corrosion of iron and steel, and one of the foremost workers in this subject is the Swiss Professor B. Zschokke of the Federal Laboratory for Tests of Materials at Zurich, Switzerland. He contributes a long and interesting article to the *Revue de Metallurgie* for March.

After a short general introduction he gives the results of experiments regarding the passivity assumed by iron and steel when exposed to certain solutions. Attention has been drawn to this fact many times by various workers, and it is known, for instance, that solutions of chromic acid and its salts, of lime and carbonate of soda, etc., exercise, under certain conditions, an extremely effective action against rust. The reasons for this action are not yet known. They may not be always the same. In regard to solutions of arsenic acid or permanganate of potash the preservative action has been attributed to very thin, clear coatings of metallic arsenic or peroxide of manganese which cover the metal when the solutions are sufficiently strong. With other solutions, however, such as those of chromic acid or its salts, the surface of polished steel remains absolutely bright, even after months and years, and some other explanation must be sought.

In any case the formation of rust is in intimate connection with electrolytic action. Results are given of the intensity of electrolytic action produced by the contact of iron with pure water and aqueous solutions of certain salts. The differences of potential for the anti-rust solutions, such as 5 per cent bichromate of soda, 1 per cent chromate of potassium or 0.5 per cent chromic acid are insignificant and in a short time sink to zero. The results show that the anti-rust solutions prevent or at least notably reduce the electrolytic action which accompanies the process of rust formation. The results of these and a large series of other experiments allow the following remarks to be made:

1. Aqueous solutions of salts of chromic acid after reaching a certain concentration preserve iron from rust for an unlimited time without the protecting action of the solutions becoming enfeebled or exhausted.
2. The passivity contributed to iron by these solutions only lasts so long as the metal is immersed in them. If the solution is removed the protection disappears and when the same sample is placed in ordinary water it begins to rust in a short time.

3. The concentration limit of a solution at which it exerts its maximum protection is not a constant amount. The action of the solution depends considerably on the ratio between the total amount of solution and the surface of the metal. If the surface is increased, either more solution must be used or its strength increased.

4. The anti-rust solutions exert their protective action not only at ordinary temperatures but at higher temperatures, up to 100 deg. C. for example.

5. The addition of certain salts to these solutions, notably the chlorides of the alkalies and alkaline earths, and also to an extent not quite as great, the sulphates of these metals, reduce, paralyze or reverse the protective action of the chrome salts, while other salts such as, for example, the carbonates of the alkalies and lime reinforce their action.

6. The protecting action of the chromic acid salts is not exerted solely on all kinds of iron and steel but on other metals such as copper, tin, brass, bronze, etc., whether they are isolated or in metallic contact with iron. For instance, small samples riveted together have been immersed in a 2 per cent solution of bichromate of sodium and are as brightly polished today as at the start of the test.

7. The protective action of these chromic acid salts is not alone on the parts of the metal in direct contact with the liquid but extends for a certain distance to the neighboring parts.

New Solutions as Preventives

These remarks and conclusions furnish the base for several new products and processes which serve, in certain cases, to prevent rust more effectively than present methods. The simplest case is the use of aqueous solutions. Numerous experiments extending over six years have shown that a solution with only 0.1 to 0.2 per cent potassium or sodium chromate, rendered slightly alkaline with sodium carbonate, suffice in most cases to protect iron or steel from rust. The water must be pure, that is, distilled or condensed water, or ordinary soft water. Such additions can be made with advantage to boiler water, to the water in hot water heating systems or in automobile radiators if the latter are not of brass or bronze. Also to the liquids used as cutting compounds during the making of saws, milling cutters, etc.

These dilute solutions can also be used to preserve small polished articles of iron or steel. Finally, materials with large absorption power such as blotting paper, cotton wool, sawdust, etc., saturated with a

mixture of 70 per cent water, 30 per cent glycerine, 2 to 3 per cent potassium chromate and 2 per cent soda, furnish packing material for preserving steel articles for years against rust. The addition of glycerine, a hygroscopic material, is to ensure the packing materials remaining moist, which is an essential condition.

Emulsions as Protection Against Rust

Solutions cannot be used as protection for steel structures. For this purpose emulsions must be prepared with certain mineral, vegetable or animal greases or oils. Only certain greases form an emulsion that does not separate in time into two layers, but these will take up 50 per cent and even 100 per cent of their weight in aqueous solutions. In spite of this considerable addition they form ointments much more tenacious and viscous than the original greases. This brings about extremely great adherence to the metal, and allows thicker layers to be used, not only forming greater resistance to moisture and air, but also allowing more of the anti-rust solution to be brought in contact with the metal. In these cases solutions with 4 to 5 per cent potassium chromate are used. Numerous tests in the laboratory and with practical experience have shown the superiority of these emulsions over ordinary greases, and illustrations of tests are given in the French article. For metallic objects exposed to the sea air emulsions with milk of lime instead of chromium salts are used. Such emulsions as mentioned above, which can be made in any desired consistency, are destined to replace the ordinary greases such as vaseline. They serve to protect from rust any material placed on one side or in storage for some time, such as rifles, pieces of artillery, polished armanent, etc., placed in arsenals.

Chromate Salts in Oil Paints

Also in the domain of oil paints these agents inducing passivity can be used with advantage. Instead of covering the metal with a base coat of red lead a priming coat can be used composed of a special very oily clay mixed with an aqueous solution of 5 per cent potassium chromate. Such a coating dries in three to five hours and adheres very strongly to the metal. As a second coat of paint with a tar base can be used, and for a third coat a paint with a linseed oil base. The two last coats exercise mostly a mechanical action but the first coat a physical action. When moisture penetrates the two outer coats it meets the chrome salt, dissolves it and puts in action the properties that render the metal passive.

Chromium Compounds in Concrete

The final application is in the domain of reinforced concrete. Long experience has proved that, under certain conditions, the concrete preserves the steel it contains for a very long time. These conditions are as follows:

1. The concrete should be as free from porosity as possible.
2. It should not contain any substance which can attack the steel chemically (such as coal ashes, which often contain sulphur).
3. The covering of concrete over the steel should not be too thin.
4. In the course of years the concrete should not crack, neither under the weight that it carries nor by contraction.

In all cases where these four conditions are met the steel reinforcement is assured against rust for a long time. The principal constituent of the cement which brings this about is the free hydrate of lime which during the mixing of the concrete forms in large amounts by the decomposition of the trisilicate of calcium. The more porous or cracked the concrete is, the more easily air enters with its carbon-dioxide and changes the hydrate to carbonate, which has no protective influence. Unfortunately many reinforced concrete structures are porous and show quantities of more or less fine cracks, and there are many cases where the steel has greatly deteriorated. Two methods of using chrome salts can be followed. The steel can be covered with a semi-liquid mass composed of cement and a

chrome solution, or the chrome salt can be added to the water used in mixing the concrete. Tests have shown that a considerable addition of a chrome salt to the concrete has no harmful action either on the setting or the crushing strength.

Chrome Salts in Cement Mortar

A somewhat similar case is the replacing of linseed oil paints with a cement mortar containing chrome salts. Practical experience has shown that even the best paints when constantly under water are much less effective in protective action than when exposed to air. The special cement coatings give better results and can be applied with a brush or a cement gun. One piece of construction carried out on this principle in 1917 consisted of a long steel conductor for a hydraulic plant, mounted in a gallery cut in the rock. The steel was carefully cleaned with a sand blast and coated with 2 to 3 mm. of cement mortar containing potassium bichromate. For the last coat ordinary cement mortar was used to avoid leaching of the chrome salts contained in the under layers. After complete hardening of the cement the surface was impregnated with a special grease. After five years the coating is still in splendid condition and it is confidently expected will last two to three times longer than any other coating used previously.

G. B. W.

Malleable Castings Production

WASHINGTON, Nov. 5.—The Department of Commerce announces statistics on the production of malleable castings manufactured for sale, by months. The returns include only those castings manufactured for sale as such and do not include those used in the plant or finished and sold as other products.

Figures are also shown comparatively for June, July, August, and September covering the operations of 103 identical plants for which reports were received each month.

Month	Plants re- porting (number)	Total produc- tion (tons)	Total ship- ments (tons)	Orders booked (tons)	Monthly capac- ity of plants (tons)	Per cent of total capacity operated
May	95	64,726	62,806	52,898	91,174	71.0
June	105	65,168	64,608	42,067	96,240	67.7
July	108	57,881	60,102	41,723	98,241	58.9
August	112	68,069	65,405	39,830	103,068	66.0
September	112	60,930	59,396	38,636	101,750	59.9

Comparative Summary for 103 Identical Plants

Month	Plants re- porting (number)	Total produc- tion (tons)	Total ship- ments (tons)	Orders booked (tons)	Monthly capac- ity of plants (tons)	Per cent of total capacity operated
June	103	63,298	62,888	39,814	94,840	66.7
July	103	54,433	55,922	39,131	94,826	57.4
August	103	63,038	60,207	36,753	94,858	66.5
September	103	56,024	54,378	35,452	93,565	59.9

New Books Received

The Prevention of Vibration and Noise. By Alec B. Eason. Pages 163, 5½ x 8½ in.; illustrated. Published by Henry Frowde and Hodder & Stoughton, Lancel Building, 1 Bedford Street, Strand, London, W. C. 2.

The Merchants' Association of New York, Year Book, 1923. Pages 394, 6¼ x 10 in.; illustrated. Published by the association, Woolworth Building, 233 Broadway, New York.

The Welding Encyclopedia. By L. B. Mackenzie and H. S. Card. Pages 437, 6 x 9 in.; illustrated. Published by the association, Woolworth Building, 233 Dearborn Street, Chicago. Price, \$5.

Strength and Structure of Steel and Other Metals. By W. E. Dalby, F.R.S. Pages 176, 6 x 9¼ in.; illustrations 169. Published by Longmans, Green & Co., 55 Fifth Avenue, New York. Price, \$6.

Journal of the Iron and Steel Institute. Vol. CVII. Edited by George C. Lloyd, Secretary. Pages 806, 5½ x 8½ in.; illustrated. Published by Spon & Chamberlain, 123 Liberty Street, New York.

Carnegie Scholarship Memoirs. Vol. XII. Edited by George C. Lloyd, Secretary Iron and Steel Institute. Pages 295, 5½ x 8½ in.; illustrated. Published by Spon & Chamberlain, 123 Liberty Street, New York.

Fire Protection in Steel Plants

Metal-Working Industries Such as Foundries and Machine Shops Have Hazards All Their Own—How Fire Is Prevented and Fought

BY JAMES M. WOLTZ*

IN the East Youngstown works we frequently receive 75 to 100 fire alarms a month; each calls from one to three companies into action. It is due to the ability of the firemen and the almost instant response to calls of small fires that we are saved serious conflagrations. Accumulations of oil and dirt in pits, wood lockers (where they still exist), wood piles, oil dipping and spraying tanks, oil-soaked floors, flashes from rolls, motors and trolley bars, hot steel set too close to buildings or in cars of wood construction, and railroad ties are all serious fire hazards. Oil, benzol and other inflammable material sometimes spill and are set on fire by locomotive sparks, and infrequently there is a hot metal spill that is grief for every one concerned.

An accurate scale map of the plant and its structures is essential. Then a personal inspection of the nooks and corners of cellars, attics, pits and floors of every building should be made:—First, to see that the map is correct; second, to see what the fire hazards may be; third, to plan location of extinguishers, hydrants and hose racks or reels; fourth, to see that ample aisle space is provided at all times, to permit unimpeded use of the fire fighting equipment.

What the Maps Should Show

1.—Maps are helpful and a necessity only if accurate and up to date. When the organization is large and the executive offices miles away, the map is usually the only available source of information as to local conditions. It should show, or separate maps should show, water lines, whether high or low-pressure, sprinkler systems, valves, gates, drains, cutouts, pumps, hydrants and other hose connections, hose reels, risers, fire houses and special equipment. Fire extinguishers, whether hand or on wheels, with size and kind, should be spotted. Fire boxes and fire alarm lines should be shown also, and the various zones definitely and accurately indicated.

Survey of Fire Hazards

2.—A careful survey of each building, shack, shanty, pit, cellar, floor and garret is essential to get an idea of the fire hazards. Then an effort should be made to have obvious hazards cleaned up and methods changed or discontinued. Wiping rags, oily waste, greasy overalls and working clothes are hazards. Dust of any kind is explosive when properly mixed with air. Paper and old files have made many bad fires. Electrical equipment, wiring, switches and connections should be gone over with minute care. Storage and use of wood, coal, oils, gas, gasoline, benzine, benzol, zylol, etc., should be carefully checked and regulated. No open fires, lights, cigars, pipes or cigarettes should be permitted where gas, oil or vapor is used, stored or issued, in rooms or in close proximity to them, even in the open.

Steam and hot water pipes should be gone over to check against the chance of wood, paper or other inflammable material coming in contact with them. Heating apparatus, stoves, electric, coal or gas, should be examined and connections checked. Proper protection under and on all sides should be provided. Chemicals and compounds should be checked as to proper storage, containers and use. Paper or cardboard shades for lamps should not be permitted. All openings through which steam, hot air or stove pipes issue should be properly protected by fire resistant material.

This is particularly important in wood structures. Waste disposal is important.

Locating Fire-Fighting Appliances

3.—Fire fighting apparatus must be distributed to advantage and where it is easy of access. A few moments lost at the inception of a fire may mean a serious conflagration. Fire doors should be checked daily to see that their automatic action is intact.

To care for fires at inaccessible places it is necessary to arrange special facilities. At each blast furnace we have a 2½-in. water line along the stairway leading to the top of the stoves and along the platforms, to which is attached a 100-ft. length of 1¼-in. rubber, wire-wrapped hose, with regular nozzle having ⅝-in. tip. On an alarm from Box 317, which indicates "Fire on Top of Furnaces," two firemen hasten to the boiler house and speed up the pump attached to the special risers, raising the pressure from the normal 110 lb. to 250. The hosemen and nozzle men, along with the captain, rush up the flight of 118 steps and stretch the line, going anywhere around the top of the furnace. Fires at this point usually arise from lighted gas igniting the oil-soaked dust, as well as the oil on the cable and wheel of the hoist.

4.—Space should be provided to operate the fire fighting equipment. Do not permit material to be piled in front of, over or around the reels or hose houses. Aisles with ample passages to haul the carts and extinguishers mounted on wheels, and to transport them through the buildings and yards, should be provided and always kept clear of obstructions.

Organization

This depends entirely upon the plant, its size, product, location as to surrounding hazards, installed fire fighting equipment, hours operated and protection available from outside sources. Careful selection of a fire brigade head is most important, for upon him and his lieutenants and their efficiency may rest the future success or failure (by destruction from fire) of the plant. He must be a diplomat, as he will be in more or less constant contact with the operating end and, of course, will have intimate association with the entire force of employees. He should know what is safe to use on the classes of fires that he will have to handle, and be equally familiar with material that is difficult and dangerous to handle. His familiarity with the power lines, water supply, exits, fire escapes, etc., will as a matter of fact come with his work. At a fire his authority should be supreme in the threatened district, superseding all operating officials.

Companies may be composed of from 6 to 12 men: a foreman, or captain, lieutenant, one hydrantman, two to four nozzle men and the rest hosemen. In some plants salvage corps, ladder truck companies and other special organizations may be required. There are 524 employees in our Youngstown district fire brigades.

Special Knowledge Important

Each battalion has its chief or commander. One company captain is usually designated as assistant. Companies are composed of workmen who can, as a rule, be best spared from ordinary operations, but should have mechanical men, such as electricians, pipe fitters, etc., as these men are, as a rule, scattered throughout the plant, know its electrical hazards, where power can be cut off from affected areas without disturbing others, know the water lines, gates and

*Youngstown Sheet & Tube Co. This is abstract of a paper read at Buffalo before the National Safety Council.

valves. It is highly important to know if it is safe to throw water on a power line or not.

Captains make reports of all responses to alarms and hold at least two drills each month. These are reported on forms, from which we make up our payroll. We pay \$1 per month to each member who attends drills. In addition, he is paid 25c. for each alarm responded to upon call and if hose is laid is paid at the rate of 50c. per hr. while on fire duty. This is reported by the captains upon the regular forms. The Youngstown district pay will run about \$10,000 per year.

Equipment and Its Care

Hose is tested at stated intervals. Each section is recorded on a card and repairs, inspection and station noted. It is taken from its station, water run through it, outside casing washed, drained and dried, twice yearly. All hose houses have in front a red lamp that is lighted at night. They have also an electric lamp inside that lights automatically when the doors are opened. Hose and all other fire equipment, including hydrants, should be used for fire purposes only. This should be a hard and fast rule.

We use 1-quart, 2-quart, 1-gal. and 10-gal. Pyrene extinguishers, 2½, 5, 20 and 40-gal. soda and acid and 2½ and 40-gal. fire foam extinguishers. These machines are distributed according to the requirements of the works:—the Pyrenes where there are electrical hazards; the soda and acids where the danger is greatest from wood fires, and the fire foam where the oil, light oil, and gas fires are the outstanding hazards. All power houses have 10-gal. tetrachloride units. These are operated by air pressure and have paid for themselves many times over. In winter the soda and acid and fire foam machines are kept in heated compartments.

Roofs are reached by steel ladders equipped with steel safety backs. Hose boxes with a full equipment

of hose, wrenches, nozzles, ropes, axes, etc., are located on tops of buildings. Risers from ground to roof are placed at convenient points. This obviates the hauling of hose from the ground to building tops, and the attending labor and danger of this work, especially under cold and icy conditions. Railed cross-overs are provided between high and low bays.

Our triple combination 750-gal. American La France pumper responds to second alarms only, except in our housing plats. This machine carries hand searchlights and approved gas masks. The Gamewell fire alarm system, with 71 boxes, is divided into zones. Fire alarms sound only in the zone from which it is desired to call companies—that is, the zone from which the alarm is sent. If necessary to call additional companies, any one or all zones can be connected and as much man power or equipment summoned as needed. This has the additional advantage of calling to fires only the force really needed and not disturbing the rest of the employees.

Help from Locomotives

As our plants cover many miles of territory, much of it difficult to reach by wagon, road or with a truck, we have equipped each standard gage locomotive with 1½-in. rubber lined hose and nozzles, carried in the cab or on reels on the tanks. The water is supplied from the injector line. Nozzles are protected to prevent burns from heated water. We have found this to be well worth while, as our engines have extinguished many an incipient fire that would have developed into serious consequences had there been no ready fire fighting apparatus at hand. All of our locomotives are also equipped with stretcher, blanket and tourniquet.

This, in a general way, covers our own organization, as well as a number of other of the largest companies who responded to my request for information as to their work, organization and equipment.

IRON AND STEEL MOVEMENT

Distribution of August Exports from United States and from Great Britain—Import Sources

WASHINGTON, Nov. 5.—Nearly 45 per cent, or 72,762 tons, of the total iron and steel exports of the United

14,326 tons, or nearly 9 per cent. Shipments to Canada, England, Spain, Brazil, Mexico and Venezuela increased from the previous month; otherwise, with slight exceptions, there was a general falling off. The most marked decrease was that of Argentina, which took only 2200 tons, against 5300 tons in July and a monthly average of more than 7100 tons for the first half of 1923.

Iron and Steel Exports from the United Kingdom and the United States in August							
		(Gross Tons)					
Countries of Destination		From United Kingdom	From United States	Countries of Destination		From United Kingdom	From United States
United Kingdom.....			6,421	India and Ceylon.....		38,032	472
United States.....		26,614		Japan.....		20,353	14,326
Canada.....		10,710	72,762	Kwantung.....			625
Belgium.....		6,582	519	New Zealand.....		5,809	191
Denmark.....		4,836	55	Philippine Islands.....			2,813
France.....		6,678	105	Straits Settlements.....		1,883	350
Germany.....		32,874	250	British East and West Africa.....		3,185	71
Italy.....		3,055	238	British South Africa.....		14,849	1,049
Netherlands.....		5,362	508	Egypt and Palestine.....		3,442	130
Norway.....		1,720	379	Portuguese East Africa.....		921	143
Portugal.....		2,182	21	British West Indies.....		700	1,215
Spain.....		3,873	1,277	Argentina.....		7,663	2,207
Sweden.....		3,756	571	Brazil.....		3,131	4,925
Switzerland.....		701	127	Chile.....		1,883	3,467
Australia.....		42,028	2,039	Colombia.....			1,801
China.....		6,022	2,345	Cuba.....			21,878
Hongkong.....		405	285				
				Dominican Republic.....			1,148
				Guatemala.....			594
				Honduras.....			401
				Mexico.....			3,300
				Panama.....			733
				Peru.....			2,533
				Uruguay.....			477
				Venezuela.....			2,059
				Other South and Central American countries.....		1,629	1,531
				All other countries.....		15,536	1,669
				Non-allocated.....		47,463	....
				Total.....		323,877	163,010

*Included under "other countries."

States during August went into Canada, according to the iron and steel division, Department of Commerce.

Principal Sources of United States Iron and Steel Imports			
Countries of Origin		1923	
		July	August
United Kingdom ..		25,164	17,792
Canada		10,608	8,263
Belgium		5,434	4,621
France		2,777	1,448
Germany		949	983
Countries of Origin		1923	
		July	August
Netherlands ..		67	449
Sweden		1,343	2,367
British India ..		228	5,064
China		211	282
Cuba		3,132	3,095

Cuba was the next largest customer, with 21,878 tons, or 13½ per cent of the total, and Japan third, with

Total imports of iron and steel amounted to 45,432 gross tons, a figure which includes 14,564 tons of pig iron, 7334 tons of ferromanganese and ferrosilicon and 9900 tons of scrap. The important sources, together with the amounts for July and August, are given in the table.

In the table of exports comparison is had between shipments from the United States and shipments from Great Britain. Canada, Cuba, Mexico, Brazil and Chile took more American than British steel. Direct comparison is uncertain, however, as there is a large tonnage of British shipments not yet allocated, portions of which may ultimately be scattered all along the list.

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ESTABLISHED 1855

THE IRON AGE

EDITORS:

A. I. FINDLEY

WILLIAM W. MACON

GEORGE SMART

C. S. BAUR, *General Advertising Manager*

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Narrow Profit in Steel

ATTENTION is being directed in the steel trade to the fact that while the United States Steel Corporation's earnings in the third quarter have been regarded as satisfactory, they represent a narrow margin per ton. Especially after allowing for the increased manufacturing cost due to elimination of the 12-hr. day, there is room for little decline in prices, if profits are to be secured.

The Steel Corporation had a good operation during the third quarter, between 85 and 90 per cent of rated capacity. Capacity, as can easily be computed from the corporation's annual reports, is approximately 16,500,000 tons a year or 53,000 tons per working day, of steel products in the form in which they leave corporation control, this including a sprinkling of rods, billets and sheet bars with the regular rolled and finished products.

The quarter's shipments amounted to about 3,600,000 tons, which with earnings at \$47,053,680 made about \$13 per ton. The amount is reached after paying ordinary expenses, also taxes and interest on subsidiary company bonds, but it must provide depreciation and sinking funds, so that by no means does it mean real "profit" even though it be assumed that interest on money owed in the form of bonds ought to be paid out of "profits."

Furthermore, the computation showing \$13 per ton does not involve any deduction for profits on products other than steel, such as cement, zinc, etc., or earnings of transportation facilities. It includes what was earned on such highly finished products as derricks, wheels and axles, brads, tin plate, railroad spikes, etc., not simply the ordinary commercial forms of rolled steel.

The expense of 12-hr. day elimination did not fall at all in July or August and it did not fall fully in September. That month, nevertheless, showed a decrease in earnings per ton attributable to that factor. It seems to be a fair estimate that with costs as they will now be, the third quarter earnings would have been reduced from \$13 a ton to about \$10.

This \$10 would not be representative of profits for the Steel Corporation, since depreciation must come out of it, and since it was not earned wholly on the ordinary rolled steel products, the current

prices for which are being discussed. In addition, it is generally admitted that on account of various special conditions the Steel Corporation has an "advantage" over the better positioned of the independent steel companies of, say, \$2 to \$3 a ton.

In the matter of profits, another point is to be considered, the rate at which a manufacturing organization should be required to operate so as to be entitled to make money. The third quarter earnings were with an operation between 85 and 90 per cent. Does the natural course of business warrant an expectation that the average manufacturer can have such an operation year by year? With all the predictions of pent-up demand for steel to be released after the war, the Steel Corporation's average operation in the four post-war years of 1919 to 1922 inclusive, was only between 70 and 71 per cent. At a 70 per cent operation, costs will be higher than at an 85 per cent operation, reducing profits per ton, while total profits will be correspondingly reduced.

As to present prices, shipments in the third quarter were in some cases below the market, being against old orders or contracts, but this tonnage was confined almost entirely to bars, shapes and plates. It is difficult to argue for any lower prices for steel, but if argument is attempted, there should be a distinction as to various products.

GARET GARRETT was once a competent financial editor on the staff of a New York daily and consequently when he joined the ranks of the novelists he was able to choose a subject and write of it knowingly, which many of them can not do. His first book, "The Driver," was not only dramatic but also was a sound treatise on economics. His new book "The Cinder Buggy," just published, is an epic of steel. Although we might be a little critical of his technology, it is good enough. His economic sense is unexceptionable. He tells of the growth of steel-making at Pittsburgh, how the managers conceived it, imagined it, planned it; and how the engineers tooled it. "There was, of course, labor. But labor no more invents the tools that are the means of economic conquests than soldiers invent the

weapons of war, and has generally less understanding of ends than soldiers have of the strategy." These sentences are almost a monograph on economics in themselves.

Mobilizing Great Industries

THE recent visit of members of the American Iron and Steel Institute to the Aberdeen Proving Ground served to recall vividly, even to those who did not go to France during the World War, the horrors of that conflict and to make more ardent the hope that there will never be another one like it, but at the same time the cost of unpreparedness was impressively presented. Taken in connection with the statement of Assistant Secretary of War Davis in regard to the efforts that the War Department is making to prepare industries for mobilization, the trip was one that should have important influence in obtaining hearty cooperation of iron and steel manufacturers in promoting reasonable preparedness.

In a recent extended review by General Pershing of Grosvenor Clarkson's admirable book, "Industrial America in the World War," is this striking paragraph:

I would that every citizen could know and appreciate even a tithe of the difficulties that were overcome by our efforts on both sides of the Atlantic. No longer would appeals for reasonable foresight in both industrial and military preparedness fall upon deaf ears. No longer would a false economic policy deprive us of the means of doing what common sense and ordinary prudence dictate as necessary in times of peace if we are to maintain our place in a world torn by passion and prejudice and still in the throes of suffering and disorder.

General Pershing then speaks of some of the mistakes in preparing for and carrying on the World War and shows that there is no practicable way in which to prepare adequately and at the same time economically *after* the emergency occurs, because there must be foresight, anticipation and preparation in peace for all eventualities.

Commenting on General Pershing's review, Mr. Clarkson points out that the Council of National Defense, created by Congress in 1916 to study in peace time industrial problems of defense and wrought by the emergency of 1917 into an active war body, is still upon the statute books, although it lapsed into inactivity two years and a half after the armistice because Congress would not appropriate money to pay its expenses.

Congress originally provided that the council should have an advisory body of seven civilians. Its members rendered highly important service in the early months of the war when there was no other industrial war machine. Mr. Clarkson says that, with the council, the advisory board could be called into action whenever Congress provides money. If, however, the old plan is not followed, Mr. Clarkson believes an official, peacetime skeleton organization should be formed, headed by one man having power to formulate policies and initiate methods. "That man," says Mr. Clarkson, "should be an outstanding industrialist who won his knowledge at the great indus-

trial drama centered in Washington in 1917-18, because, as a matter of common sense, industrial problems, for war or peace, should be solved by those industrially trained or those who went through the furnace along the Potomac front during our part in the World War."

Mr. Clarkson praises the work that is being done by Assistant Secretary of War Davis, and says it is taking a long stride forward, but he believes it is not enough, because "knowledge, mapped, charted and classified, of war's terrible demands on industry must be not only technically and mathematically sound; it must be practical, resilient, dynamic to the last ounce called for by successful administration."

Having obtained the cooperation of manufacturers, the efforts of the War Department, aided by constructive criticism of such men as Pershing and Clarkson, would make a powerful appeal for suitable action by Congress.

Economic Missteps in Europe

A RESULT of the war was the division of two of the great countries of Europe into many little countries. If Germany be disrupted, the process will go further. Self-determination may be commendable politically, but how little thought has been given to its opposition to the economic principle of the international division of labor. That principle may be expressed as the desirability of letting every country produce the things that it can most advantageously and exchange its goods freely with all other countries. Tariff barriers are set up in opposition to it, theoretically to help make each country as nearly self-supporting as possible. Not only does every country want to supply its own requirements, but also it wants to be independent in time of war. The more national units there are, therefore, the more duplication of plant, the less advantageous exploitation of resources and application of work, the less efficiency on the whole.

There is in this a direct counteraction of the principle of the international division of labor. This is an economic setback that is quite apart from the serious misstep of shortening working hours at the very time when more work than ever was the one panacea for crippled Europe.

THE administration of the Sherman act and supplemental laws by the Department of Justice and the Federal Trade Commission is one of the vagaries of commercial life in the United States. The copper producers are constantly under suspicion and have to lean over backward in their rectitude. They are subjected to prolonged and costly investigations at times when anyone of market sense from a few days observation of the behavior of the market could pronounce positively that there was no such thing as collusion among them. Indeed, anyone who knows his way around is aware that copper selling is something of fierce competition. The Joplin zinc producers, on the other hand, openly get together and agree upon plans for curtailment of production for the avowed

purpose of raising the price of ore and Washington is in no way concerned. It may be that the Sherman law runs in what is broadly described as Wall Street, and not in the rest of the country. There are other laws that appear to have limited geographical and industrial application. For instance, there are ocular evidences, through the ownership and operation of automobiles and such things, that the income tax laws do not apply to all of the people of the country, but exempt some millions, especially among wage earners who escape reporting by their employers.

Placing the Worker

THE placing of workers in the individual industrial plant so that each may have, as nearly as possible, the task best suited to his skill, strength, adaptability, temperament and otherwise, has been given increasing attention in recent years. Many firms have established systems in the attempt to accomplish this result, some of them very simple systems, others, especially where quantity production is carried on and manufacturing operations are highly standardized, more complex and along what might be called scientific lines. This general phase of management has now been subjected to sufficient test to demonstrate that when wisely conducted, with full co-ordination of effort between heads of departments and those having in hand the specialized conduct of the system, it gives results which substantially benefit both owners and employees.

One large plant, a wire mill manufacturing many specialties and employing a wide variety of labor, skilled and unskilled, has evolved what is held to be a very effective system, which imposes no great amount of additional responsibility and labor upon the employment office. In the opinion of the management it has served to increase output and at the same time to raise the shop morale.

A man applies for work, is accepted and is turned over to the foreman of some department who has asked for additional help. He is put to work and given the chance to make good. But he may dislike the task assigned him, may realize that it is beyond his strength or not along lines of previous training. Or he may find the environment distasteful. He may then be sent back to the employment office for placement in another job or department. Instances are not uncommon of repeated trials before the right niche is found.

The managing officers of the plant frankly state that their system would be valueless, probably disorganizing in its influence, if they did not have full cooperation between the employment office and the foremen. The personal factor they feel to be all-important. The wrong employment manager could make a great deal of trouble, and so, too, could foremen who were out of sympathy with the plan. When turn-over is only normally active or when the force is not being increased rapidly, the foreman is consulted before a newly hired man is turned over to him, or when a transfer is made to him from some other department. Then, too, when a vacancy occurs,

a foreman often recommends his own man, who then goes to the employment office and is hired, with his job already selected. Contrary to common understanding, that heads of departments prefer to hire their own men, without the intervention of an employment office, under this particular system they are fully satisfied with the results attained.

The other extreme of practice, in the sense that scientific tests are employed, is found in the system adopted by the West Lynn works of the General Electric Co. Applicants for work are required to do certain things. With girls to be employed on special manufacturing processes, tests prove quickly whether or not they are deft and nimble with their hands, and whether they are intelligent and adaptable. Workers already employed also receive the tests, which practice has caused many a worth-while transfer. In fact, all employees are invited to take whatever tests they may desire in searching out their own fitness.

These are examples of methods employed in placing workers, each presumed to be adapted to the plant in which it is operating. But owners who have become interested in this side of industrial management realize that the science of fitting men and women into industry is still in its infancy. There is need for the records of those who have experiences of even special as well as broad application.

State Pensions for the Aged

THE subject of old-age pensions is occupying a good deal of the attention of the social reformers, and has been for several years. It chances not to be an industrial question. Industry is interested only as all members of the community are interested, for the laws already enacted in certain States and urged for others make it apply to all persons, whatever their employment may have been, who because of advancing years, with 65 years as the usual limit, have ceased to be self-supporting owing to misfortune or lack of habits of thrift. They must be dependent upon some one, either family or friends or the State. The American movement follows the adoption of the plan in Great Britain.

Paternalism of this character appeals to many people whose vision fails to see more than one side of the question. They see a burden placed upon the children and other relatives of the old people, and perhaps the poorhouse. They fail to see, as a speaker at one of the great industrial association meetings stated the other day, that "State-help kills self-help." Old men and women would be given money which their more fortunate or wiser fellow citizens must furnish in the form of taxes. To accept such a pension constitutes a form of pauperism. Considered from an economic standpoint, an additional burden is placed upon industry in the form of increased taxes.

The strength of the demand for old-age pensions in some form or other is not to be underestimated. This last year old-age pension acts were passed in Pennsylvania, Montana and Nevada, and failed of passage by a very narrow

margin in Illinois. Alaska has extended a similar law enacted in 1915. The subject is under examination by State authorities in Massachusetts and Indiana. Arizona, in 1915, by popular referendum, adopted a scheme of old-age pensions which, however, was held to be unconstitutional because as part of it all almshouses were ordered closed, which was in violation of a provision of the State constitution.

JAPANESE BUYING ACTIVE

Government Tender on Sheets and Nails to Close Soon—Private Inquiries for Sheets, Nails, Wire and Pipe

NEW YORK, Nov. 5.—Trade with Japan continues quite active with prospect of even heavier buying in the future. Inquiry and purchase on galvanized sheets is diminishing as the galvanizing plants of Japan are able to meet the present heavy demand, but there has been a proportionate increase in the number and size of inquiries for light gage black sheets. Any interest now shown by Japanese buyers in the galvanized product would doubtless be for prompt delivery, as the galvanizing plants are reported heavily booked for the next three to four months. It is estimated by leading Japanese import and export houses in New York that total purchases of sheets, black and galvanized, in the past few weeks has been close to 40,000 tons. Some of this tonnage has been for warehouses in Osaka and Kobe and part for the galvanizing plants. This is exclusive of the pending purchase by the Japanese government, which it is expected, will be awarded this week. This tonnage, which has been current for several weeks has been reduced on the final tender to about 20,000 tons of sheets and about 7000 metric tons of wire nails. Final decision on the method of purchase of this and future tonnages has not yet been made, but it is reported from reliable sources that buying will probably be direct from the mill.

Purchasing of gas pipe has been heavy. Most of the inquiries have been for British specifications, although it is reported that the Tokio Gas Co., on its recent purchase of about 800 tons of pipe accepted American gage. Quoting prices that are slightly lower than the American export quotation, Canadian mills have booked some fair tonnages of wire rods and wire nails. A few lots of structural material and bars are reported to have been placed with Belgian makers, who are quoting as low as \$44 per ton base, c. i. f. Japan, on bars, compared with about \$60 per ton base, c. i. f. Japan, by American mills.

The major portion of future buying of structural steel, it is believed, will be from mills in the United States, American sections having withstood the earthquake well, or from British makers, whose reputation for quality is also considered excellent by the Japanese.

Current inquiries, beside those for black sheets of Nos. 28, 30 and 31 gage, include some small tonnages of No. 8 gage galvanized wire, probably for fencing, a number of inquiries for wire nails, ranging from 1000 kegs to 3000 and 4000 kegs, gas pipe, bars, some machine tools, etc. Prospect of much of this business being placed with mills in the United States is believed good by most exporters, who report keen competition for orders and considerably improved delivery, November-December shipment being offered on many products.

Much of the recent improvement in trade with China, is explained by exporters to the Far East less as an actual improvement of Chinese conditions and more as a result of the closer approach of American quotations to Chinese price ideas. Exporters to China report that after several months of futile cabling of prices on sheet bar crop ends, plate cuttings and second hand material, the American prices have finally reached a point where some business can be transacted

Old-age pensions in industry are a very different matter indeed. They surely have an economic value. There is nothing about the acceptance of such an award to strike at a man's self-respect. His labor and loyalty and long service have earned it for him. It goes alike to the thrifty and the indigent. To be pensioned by an institution like the United States Steel Corporation is a badge of honor.

with Chinese merchants. There has also been some fairly good business in galvanized sheets, pipe and tin plate.

Tenders on a precision lathe, including all necessary tools and accessories, have been invited by the chief storekeeper of the Victorian Railways Commission, Melbourne, Australia. The lathe is to have an 18-in. swing with 54-in. between centers. The Bureau of Foreign and Domestic Commerce has the specifications, which are available at the district offices in New York, Boston, and Cincinnati. The department will put American builders in touch with Australian dealers willing to represent them. Bids close Dec. 19.

Kotera Shoten, importers and exporters of metals, 40 Minami-watayamachi, Minamaku, Osaka, Japan, is desirous of making connections in the United States with dealers in brass and copper scrap.

Bids for Battleships Accepted by the Navy Department

WASHINGTON, Nov. 6.—The Navy Department has accepted the following bids for battleships afloat, proposals for which were opened at the department Nov. 1:

American Iron & Metal Co., Oakland, Calif., for the Georgia, \$58,666; for the Rhode Island, \$47,666. Both vessels now at the Mare Island Navy Yard, Calif.

Walter W. Johnson, San Francisco, for the Connecticut, \$42,750, now at the Puget Sound Navy Yard, Washington.

The Boston Iron & Metal Co., Baltimore, for the New Hampshire, \$66,560; for the Louisiana, \$66,560; both vessels now at the Philadelphia Navy Yard.

Vessels on the ways at Navy yards, bids for which were submitted in the sale of Oct. 25, have been awarded as follows:

Battleship North Carolina, at Norfolk, to N. Block & Co., Norfolk, Va., at their bid on "as is, where is" basis, \$42,365.

Battleships Indiana and South Dakota, at New York, to the Steel Scrap Co., Philadelphia, at its bid on a tonnage basis, of \$9.51 per gross ton, cut to shipping sizes, f.o.b. car; estimated total for Indiana, \$92,969.76; for South Dakota, \$103,107.42.

Battle Cruisers United States and Constitution, at Philadelphia, to Steel Scrap Co., Philadelphia, at its bid on a tonnage basis, of \$13.26 per gross ton, cut to shipping sizes, f.o.b. cars; estimated total for the United States, \$84,996.60; for the Constitution, \$92,024.40.

Dr. Siegfried Werner, president of the German Foundrymen's Association, will deliver an address on the Schuermann hot blast cupola before the Chicago Foundrymen's Club, at the City Club, Chicago, Saturday evening, Nov. 10. Dr. Werner holds the patents on this design of cupola and is in this country for the purpose of visiting the first American installation at the 445 North Sacramento Boulevard, Chicago, plant of the Griffin Wheel Co. Those desiring to see the cupola in operation will have an opportunity between 9 a. m. and 2 p. m., Nov. 10.

By sending a piece of German currency, such as a 100,000 mark note, to each of the users and potential users of its flexible tools, the Stow Mfg. Co., Binghamton, N. Y., is emphasizing that the cheap tool in the shop is depreciating just as the mark and by inference account should be taken of equipment that might well be renewed.

OCTOBER IRON OUTPUT

Decline from September 2598 Tons Per Day—Rate Lowest of the Year

Eighteen Furnaces Down or Banked and Eight Blown In—Net Loss of Ten

October's output of the blast furnaces revealed a further decline, but it was by no means as large as in August and September. According to statistics, the loss in daily rate of production in October was only 2598 tons per day compared with 7090 tons and 7382 tons per day in September and August respectively. The net loss of 10 furnaces was also less than in the past two months, September's loss having been 15 and August's 28.

Production of coke and anthracite pig iron for the 31 days in October amounted to 3,149,158 gross tons, or 101,586 tons per day, as compared with 3,125,512 tons, or 104,184 tons per day in September, a 30-day month. The October daily rate was the lowest for the year, although the total showed an increase over September, due to the extra day for operating. There were 18 furnaces blown out or banked and 8 blown in, a net loss of 10.

The total number of furnaces in blast on Nov. 1 was 245, as compared with 255 on Oct. 1. On July 1 there were 323 furnaces in blast, the largest this year. The capacity of the 245 furnaces in blast Nov. 1 is estimated at 99,030 tons per day, as compared with 102,100 tons per day for the 255 furnaces operating on Oct. 1.

Production of ferromanganese continues heavy at 20,015 for October. The largest spiegeleisen output of the year was the 15,931 tons made in October.

Daily Rate of Production

The daily rate of production of coke and anthracite pig iron by months, from October, 1922, is as follows:

Daily Rate of Pig Iron Production by Months—Gross Tons			
	Steel Works	Merchant	Total
October, 1922.....	66,060	19,032	85,092
November.....	72,177	22,813	94,990
December.....	75,179	24,398	99,577
January, 1923.....	79,991	24,190	104,181
February.....	80,684	26,251	106,935
March.....	87,881	25,792	113,673
April.....	90,145	28,179	118,324
May.....	96,029	28,735	124,764
June.....	90,907	31,641	122,548
July.....	88,798	29,858	118,656
August.....	86,479	24,795	111,274
September.....	78,799	25,385	104,184
October.....	77,255	24,331	101,586

The figures for daily average production, beginning with January, 1917, are as follows:

Daily Average Production of Coke and Anthracite Pig Iron in the United States by Months Since Jan. 1, 1917—Gross Tons										
	1917	1918	1919	1920	1921	1922	1923			
Jan.	101,643	77,799	106,525	97,264	77,945	53,063	104,181			
Feb.	94,473	82,835	105,006	102,720	69,187	58,214	106,935			
Mar.	104,882	103,648	99,685	108,900	51,468	65,675	113,673			
Apr.	111,165	109,607	82,607	91,327	39,768	69,070	118,324			
May	110,238	111,175	68,002	96,312	39,394	74,409	124,764			
June	109,002	110,793	70,495	101,451	35,494	78,701	122,280			
July	107,820	110,354	78,340	98,931	27,889	77,592	118,656			
Aug.	104,772	109,341	88,496	101,529	30,780	58,586	111,274			
Sept.	104,465	113,942	82,932	104,310	32,850	67,791	104,184			
Oct.	106,550	112,482	60,115	106,212	40,215	85,092	101,586			
Nov.	106,859	111,802	79,745	97,830	47,183	94,990	.....		
Dec.	92,997	110,762	84,944	87,222	53,196	99,577	.....		
Year	104,619	105,496	83,789	99,492	45,325	73,645	.....		

Among the furnaces blown in during October were the following: No. 1 furnace of the New Jersey Zinc Co. in the Lehigh Valley; the Robeson furnace in the Lebanon Valley; one Alliquippa furnace of the Jones & Laughlin Steel Corporation in the Pittsburgh district; the Covington furnace of the Low Moor Iron Co. in Virginia; the Norton furnace in Kentucky; the Anna furnace in the Mahoning Valley; the Alabama City furnace of the Gulf States Steel Co. in Alabama and one Allen's Creek (Wrigley) furnace of the Bon Air Coal & Iron Co. in Tennessee.

Among the furnaces blown out or banked during October were the following: C and E furnaces at the Lackawanna plant of the Bethlehem Steel Co. in the Buffalo district and No. 2 furnace of the Northern Iron Co. in New York; one Lebanon furnace of the Bethlehem Steel Co. in the Lebanon Valley; No. 2 furnace of the American Steel & Wire Co., one Edgar Thomson furnace of the Carnegie Steel Co. and two Eliza furnaces and the Soho furnace of the Jones & Laughlin Steel Corporation in the Pittsburgh district; the Claire furnace in the Shenango Valley; one Johnstown furnace at the Cambria plant of the Bethlehem Steel Corporation in western Pennsylvania; one Low Moor furnace and the Goshen furnace in Virginia; one LaBelle (or Steubenville) furnace of the Wheeling Steel Corporation in the Wheeling district; No. 1 Brier Hill furnace of the Youngstown Sheet & Tube Co. in the Mahoning Valley; the Hamilton (Hanging Rock) furnace in southern Ohio; and the Thomas furnace of the Thomas Iron Co. in Wisconsin.

Output by Districts

The accompanying table gives the production of all coke and anthracite furnaces for October and the three months preceding:

Pig Iron Production by Districts, Gross Tons				
	Oct. (31 days)	Sept. (30 days)	Aug. (31 days)	July (31 days)
New York.....	219,857	208,737	246,347	265,406
New Jersey.....	19,473	18,293	19,449	18,920
Lehigh Valley.....	81,614	73,945	79,529	90,231
Schuylkill Valley ..	91,457	88,699	108,448	116,428
Lower Susquehanna and Lebanon Val- leys.....	60,568	56,531	56,884	74,645
Pittsburgh district..	653,970	659,963	713,314	759,159
Shenango Valley....	117,656	127,781	117,133	142,419
Western Pa.....	157,649	157,960	193,611	205,059
Maryland, Virginia and Kentucky....	60,278	55,581	81,826	91,443
Wheeling district...	141,593	147,771	159,418	155,324
Mahoning Valley...	279,834	286,558	338,466	366,681
Central and North- ern Ohio.....	282,009	273,885	287,641	286,021
Southern Ohio.....	36,083	37,416	46,779	72,120
Illinois and Indiana	595,457	587,323	631,225	643,043
Mich., Minn., Mo., Wis. and Colo....	117,128	113,460	121,172	139,330
Alabama.....	213,105	213,083	230,468	236,049
Tennessee.....	21,427	18,526	17,783	16,056
Total.....	3,149,158	3,125,512	3,449,493	3,678,334

Capacities in Blast Nov. 1

The following table shows the number of furnaces in blast Nov. 1 in the different districts and their capacity, also the number and daily capacity in gross tons of furnaces in blast Oct. 1:

Coke and Anthracite Furnaces in Blast					
Location of Furnaces	Total Stacks	In Blast	Nov. 1 Capacity per Day	In Blast	Oct. 1 Capacity per Day
New York:					
Buffalo.....	21	15	6,140	16	6,620
Ferromanganese ..	1	0	.....	1	100
Other New York ..	5	2	400	3	735
New Jersey.....	4	2	625	2	610
Pennsylvania:					
Lehigh Valley	16	6	2,430	6	2,365
Spiegeleisen	2	2	210	1	100
Schuylkill Valley ..	15	9	2,750	9	2,625
Lower Susquehanna ..	9	5	1,525	5	1,550
Ferromanganese ..	1	1	65	1	65
Lebanon Valley	6	1	115	1	185
Ferromanganese ..	2	1	85	1	80
Pittsburgh district..	55	43	19,350	47	21,370
Ferro and Spiegel ..	4	3	485	3	340
Shenango Valley....	19	9	3,760	10	3,770
Western Pennsylvania	25	13	4,880	14	4,915
Ferro and Spiegel ..	2	2	300	2	275
Maryland.....	5	3	960	3	1,280
Ferromanganese ..	1	1	100	1	90
Wheeling district	15	10	4,500	11	4,925
Ohio:					
Mahoning Valley ..	28	19	9,000	19	9,200
Central and Northern	26	18	9,000	18	8,900
Southern.....	16	3	1,030	4	1,175
Illinois and Indiana..	42	35	18,950	35	18,900
Mich., Wis. and Minn..	12	8	3,295	9	3,400
Colorado and Missouri	6	1	410	1	335
The South:					
Virginia.....	18	4	700	5	645
Kentucky.....	7	2	400	1	190
Alabama.....	39	22	6,965	21	6,740
Ferromanganese ..	1	0	.....	0	.....
Tenn., Ga. and Texas	16	5	600	5	615
Total.....	418	245	99,030	255	102,100

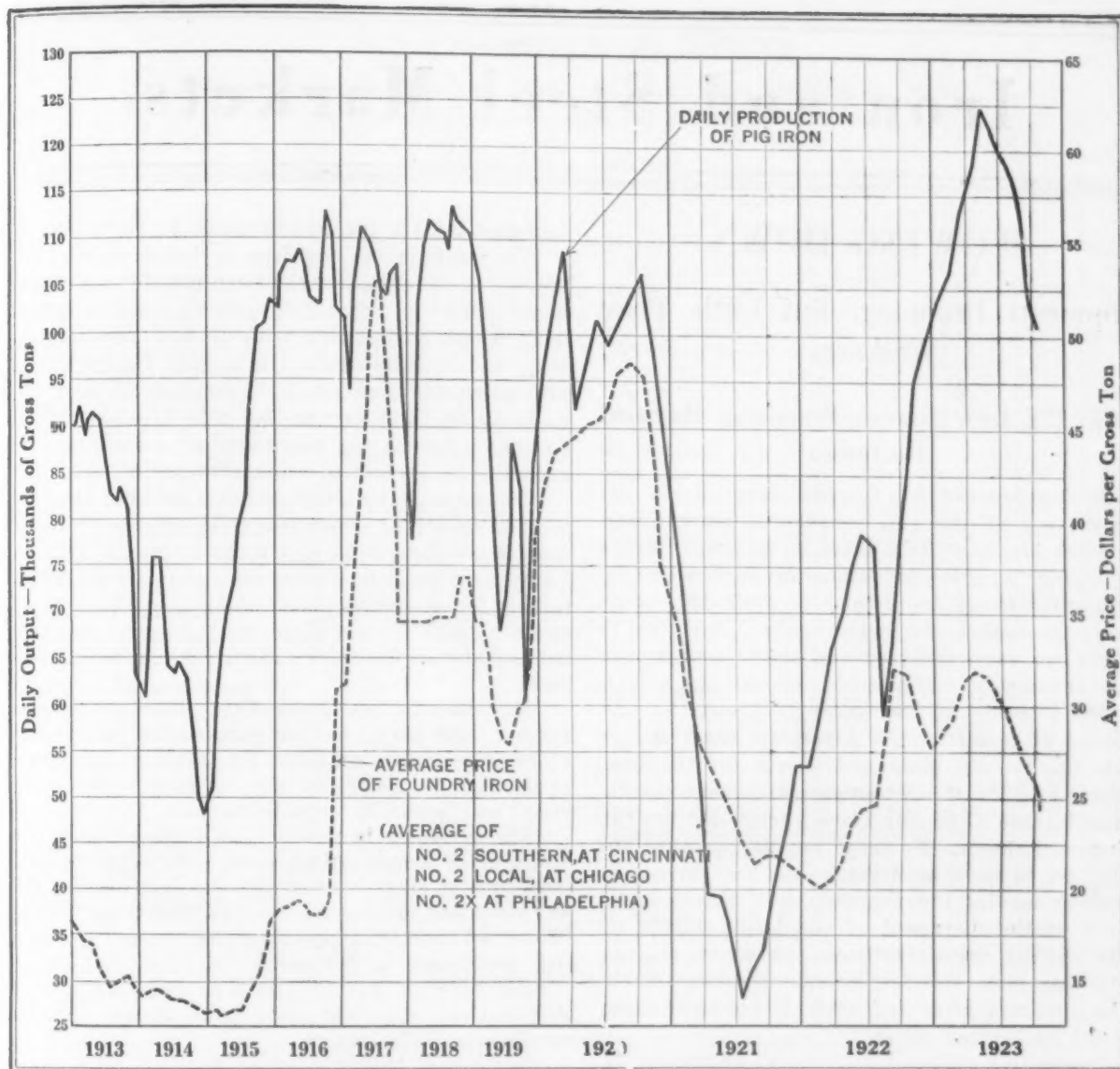


Diagram of Pig Iron Production and Price

Production of Steel Companies—Gross Tons

Returns from all furnaces of the United States Steel Corporation and the various independent steel companies, as well as from merchant furnaces producing ferromanganese and spiegeleisen, show the foregoing totals of steel making iron, month by month, together with ferromanganese and spiegeleisen. These

Production of Steel Companies—Gross Tons		Spiegeleisen and Ferromanganese		1922		1923	
Total Production		1922		1923		1923	
		Fe-Mn Spiegel	Fe-Mn Spiegel	Fe-Mn Spiegel	Fe-Mn Spiegel	Fe-Mn Spiegel	Fe-Mn Spiegel
Jan.	1,306,045	2,479,727	6,874	1,230	19,358	12,056	
Feb.	1,311,170	2,259,154	3,610	4,930	21,282	3,657	
Mar.	1,629,982	2,724,305	11,600	2,095	20,720	13,822	
Apr.	1,707,902	2,704,360	14,998	4,211	20,808	7,440	
May	1,879,180	2,976,892	15,422	4,902	19,568	9,533	
June	1,876,033	2,727,208	18,273	4,817	19,717	13,289	
6 mos.	9,710,312	15,871,646	70,787	22,185	121,564	64,807	
July	1,931,138	2,752,738	18,873	7,176	26,493	13,876	
Aug.	1,415,832	2,680,851	11,402	7,925	22,045	5,586	
Sept.	1,615,696	2,363,967	10,681	4,235	23,206	4,478	
Oct.	2,047,873	2,394,922	9,193	12,283	20,015	15,931	
Nov.	2,165,295		13,232	4,192			
Dec.	2,330,545		17,007	10,591			
Year	21,216,691		151,175	68,587			
10 mos.	26,064,124			213,323	103,678		

last, while stated separately, are also included in the columns of "total production."

The fluctuations in pig iron production from 1913 to the present time are shown in the accompanying chart. The figures represented by the heavy lines are those of the daily average production, by months, of coke and anthracite iron. The dotted curve on the

chart represents monthly average prices of Southern No. 2 foundry pig iron at Cincinnati, local No. 2 foundry iron at furnaces in Chicago, and No. 2X at Philadelphia. They are based on the weekly quotations of THE IRON AGE.

Production of Coke and Anthracite Pig Iron in the United States by Months, Beginning Jan. 1, 1919—Gross Tons

	1919	1920	1921	1922	1923
Jan.	3,302,260	3,015,181	2,416,292	1,644,951	3,229,604
Feb.	2,940,168	2,978,879	1,937,257	1,629,991	2,994,187
Mar.	3,090,243	3,375,907	1,595,522	2,035,920	3,523,868
Apr.	2,478,218	2,739,797	1,193,041	2,072,114	3,549,736
May	2,108,056	2,985,682	1,221,221	2,306,679	3,867,694
June	2,114,863	3,043,540	1,064,823	2,361,023	3,676,445
½ year.	16,033,808	18,138,986	9,428,166	12,050,683	20,841,534
July	2,428,541	3,067,043	864,555	2,405,365	2,678,334
Aug.	2,743,388	3,147,402	954,193	1,816,170	2,449,493
Sept.	2,487,965	3,129,323	955,529	2,033,720	3,125,512
Oct.	1,863,558	3,292,597	1,246,676	2,637,844	3,149,158
Nov.	2,392,350	2,924,908	1,415,481	2,849,703	
Dec.	2,633,268	2,703,855	1,469,086	3,086,898	
Year*	30,582,878	36,414,114	16,543,686	26,880,283	
10 mos.					34,244,031

*These totals do not include charcoal pig iron. The 1923 production of this iron was 234,781 tons.

Three new correspondence courses in hydraulic engineering, intended to meet needs of mechanical, civil, municipal and water works engineers, have been instituted by the Extension Division, University of Wisconsin. The first course deals with pressures, the second with flow, and the third with description, theory and testing of various types of hydraulic motors and pumps.

Iron and Steel Markets

SLOWING DOWN

Shipments Dropping, But Little Price Weakness

Basic Pig Iron Lower—Promising Railroad Business

Steel production has further slowed down, but the closing of the gap between shipments and bookings has had little effect on prices. Buyers are trying for price reductions on current needs, but producers see no promise of expanding operations by taking the price route. Business is largely for early delivery and its volume proves that consumption rather than restocking is a fact.

The attitude of the seller is shown by the opening of books by the American Sheet & Tin Plate Co. for tin plate and sheets for the first quarter of 1924 at the company's current prices. These include 3.85c. for black sheets and 5c. for galvanized sheets. No large buying response appears yet to have been made, but the move, followed by leading independents, is a notable indication of the disregard of the large makers of price cutting uncovered here and there, though 3.75c. has been general enough in black sheets to be a market price and 4.90c. is not uncommon for the galvanized product.

Prospective railroad purchases, known to be large, are being held back in part through concern over adverse turns which railroad legislation may take. These as one of the sources of demand of the early future are being augmented by some increased general buying interest respecting the first quarter.

The ordering of 1000 hopper car bodies by the Baltimore & Ohio and inquiries for 2000 gondolas by the Chesapeake & Ohio and for 1750 automobile cars and probably for 250 gondolas by the Wabash are definite signs of the expected renewal of railroad car buying. More than 200 locomotives are being figured on, of which 60 are for the Union Pacific.

The Nickel Plate has distributed 18,000 tons of rails and the Monon has bought 4000 tons. The Southern Railway is inquiring for 35,000 tons.

Pig iron production fell off less than 2½ per cent from September. Complete returns show 3,149,158 tons for the 31 days of October, or 101,586 tons per day, against 3,125,512 tons in September, or 104,184 tons per day. While the October rate is the lowest for the year, it is higher than any month in 1921 or 1922.

Eighteen furnaces were blown out or banked and 8 were blown in, 6 of which were merchant stacks. The net loss of 10 furnaces last month compares with 28 in August and 15 in September. The 245 furnaces in blast Nov. 1 represent a daily capacity of about 99,030 tons against about 102,100

tons per day for the 255 furnaces in blast Oct. 1.

More interest in pig iron is being shown, especially in Chicago, but sales are not for large tonnages and lower prices have been recorded at Cleveland, where competition with Buffalo furnaces is keen, and at Pittsburgh. In eastern Pennsylvania production has been heavily decreased. A contract made by an Ohio furnace for coke at about \$3.50 per ton indicates the possibility of a considerable reduction in the cost of manufacturing pig iron.

The unusual building activity for this time of year is shown by structural steel awards of more than 19,000 tons, while new projects, mostly in New York, total close to 40,000 tons. Of these 18,000 tons is for a new telephone building in New York. Revised plans for the Ford steel plant at Detroit, not included in the week's inquiries, call for 26,000 tons.

A 3c. base for cold finished steel bars has become general and 2.15c. has reappeared in light rails rolled from billets, while for hot rolled strips a base price above 3c. refers usually to small orders. On hoops and bands 3c. is more common.

The weakness in sheets is in contrast with the strength of semi-finished steel. An offer to buy 3000 tons of sheet bars at \$40 was ineffectual. Of 120 sheet and jobbing mills in the Mahoning Valley, 63 are scheduled for operation, the lowest production percentage in 18 months.

Save for a change in sheets in July, THE IRON AGE finished steel composite price stands for six months at 2.775c. per lb.

Basic iron having dropped further, THE IRON AGE pig iron composite price has gone to \$22.02 from \$22.27 last week, being now nearly \$9 below the high level of early April.

Pittsburgh

More Inquiry, But Little, if Any, Increase in Orders

PITTSBURGH, Nov. 6.—Sentiment in the steel trade here remains fairly hopeful, but it still appears to be based more upon prospective than actual business. The general inquiry is heavier, but it is doubtful whether orders are any larger than they have been in recent weeks. Buyers still cling largely to the policy of covering their known requirements and are letting their stocks run down. There is no idea that prices are going to be higher right away and while expectations long entertained of the lower prices have been realized only in part, the general feeling among consumers is that nothing is to be lost by "sailing close to the wind" in the matter of purchases.

The various units of the Steel Corporation still are enjoying a good rate of operation, but the lack of forward buying is beginning to tell on the activities of the independents. In the Youngstown district there has been a clear slowing, particularly at the sheet mills, and locally the effort to maintain economical operations has resulted in some additions to stock. The outlook is for further curtailment among the independent companies over the remainder of the year. Chief reliance for improved business is placed upon the railroads, but so far as local mills are concerned,

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Nov. 6, 1923	Oct. 30, 1923	Oct. 9, 1923	Nov. 7, 1922
No. 2X, Philadelphia.....	\$22.64	\$22.64	\$24.76	\$31.14
No. 2, Valley furnace.....	22.50	22.50	24.00	29.00
No. 2, Southern, Cin'tl't.....	23.55	23.55	25.05	29.05
No. 2, Birmingham, Ala. f.....	19.50	19.50	21.00	25.00
No. 2 foundry, Chicago*.....	24.00	24.00	25.00	30.00
Basic, del'd, eastern Pa.....	23.00	23.00	24.50	28.14
Basic, Valley furnace.....	22.00	22.50	24.00	29.00
Valley Bessemer, del. P'gh.....	26.26	26.76	27.26	34.27
Malleable, Chicago*.....	24.00	24.00	25.00	30.00
Malleable, Valley.....	22.00	22.00	24.00	30.00
Gray forge, Pittsburgh.....	23.76	24.26	25.26	30.77
L. S. charcoal, Chicago.....	29.15	29.15	30.04	36.15
Ferromanganese furnace.....	110.00	110.00	110.00	100.00

Rails, Billets, Etc., Per Gross Ton:	Nov. 6, 1923	Oct. 30, 1923	Oct. 9, 1923	Nov. 7, 1922
O.-h. rails, heavy, at mill.....	\$43.00	\$43.00	\$43.00	\$43.00
Bess. billets, Pittsburgh.....	40.00	40.00	40.00	38.00
O.-h. billets, Pittsburgh.....	40.00	40.00	40.00	38.00
O.-h. sheet bars, P'gh.....	42.50	42.50	42.50	38.00
Forging billets, base, P'gh.....	45.00	47.50	47.50	45.00
O.-h. billets, Phila.....	45.17	45.17	45.17	45.17
Wire rods, Pittsburgh.....	51.00	51.00	51.00	45.00
Skelp, gr. steel, P'gh, lb.....	2.40	2.40	2.40	2.00
Light rails at mill.....	2.15	2.25	2.15	2.00

Finished Iron and Steel, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia.....	2.67	2.67	2.67	2.325
Iron bars, Chicago.....	2.40	2.40	2.35	2.50
Steel bars, Pittsburgh.....	2.40	2.40	2.40	2.00
Steel bars, Chicago.....	2.50	2.50	2.50	2.10
Steel bars, New York.....	2.74	2.74	2.74	2.34
Tank plates, Pittsburgh.....	2.50	2.50	2.50	2.00
Tank plates, Chicago.....	2.60	2.60	2.60	2.30
Tank plates, New York.....	2.74	2.74	2.84	2.34
Beams, Pittsburgh.....	2.50	2.50	2.50	2.00
Beams, Chicago.....	2.60	2.60	2.60	2.20
Beams, New York.....	2.74	2.74	2.84	2.34
Steel hoops, Pittsburgh.....	3.15	3.15	3.15	2.90

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Sheets, Nails and Wire, Per Lb. to Large Buyers:	Nov. 6, 1923	Oct. 30, 1923	Oct. 9, 1923	Nov. 7, 1922
Sheets, black, No. 28, P'gh.....	3.75	3.75	3.75	3.35
Sheets, galv., No. 28, P'gh.....	5.00	5.00	5.00	4.50
Sheets, blue an'l'd, 9 & 10.....	3.00	3.00	3.00	2.60
Wire nails, Pittsburgh.....	3.00	3.00	3.00	2.70
Plain wire, Pittsburgh.....	2.75	2.75	2.75	2.45
Barbed wire, galv., P'gh.....	3.80	3.80	3.80	3.35
Tin plate, 100-lb. box, P'gh.....	\$5.50	\$5.50	\$5.50	\$4.75

Old Material, Per Gross Ton:	Nov. 6, 1923	Oct. 30, 1923	Oct. 9, 1923	Nov. 7, 1922
Carwheels, Chicago.....	\$17.50	\$17.50	\$18.00	\$25.00
Carwheels, Philadelphia.....	17.50	19.00	20.50	21.00
Heavy steel scrap, P'gh.....	15.50	15.00	16.00	20.50
Heavy steel scrap, Phila.....	15.00	15.00	16.00	16.50
Heavy steel scrap, Ch'go.....	13.50	13.50	14.15	17.75
No. 1 cast, Pittsburgh.....	18.50	18.50	20.00	23.50
No. 1 cast, Philadelphia.....	19.00	19.00	19.50	22.00
No. 1 cast, Ch'go (net ton).....	18.00	18.00	19.00	20.50
No. 1 RR. wrot. Phila.....	17.00	17.00	19.00	19.00
No. 1 RR. wrot. Ch'go (net).....	12.00	12.00	14.00	16.50

Coke, Connellsville, Per Net Ton at Oven:	Nov. 6, 1923	Oct. 30, 1923	Oct. 9, 1923	Nov. 7, 1922
Furnace coke, prompt.....	\$3.75	\$3.75	\$4.00	\$7.50
Foundry coke, prompt.....	4.75	4.75	4.75	9.00

Metals, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York.....	13.00	13.00	13.00	14.12½
Electrolytic copper, refinery.....	12.37½	12.25	12.75	13.62½
Zinc, St. Louis.....	6.35	6.32½	6.30	7.10
Zinc, New York.....	6.75	6.67½	6.65	7.45
Lead, St. Louis.....	6.45	6.45	6.65	6.85
Lead, New York.....	6.75	6.75	6.85	7.15
Tin (Straits), New York.....	41.87½	41.50	42.25	38.00
Antimony (Asiatic), N. Y.....	9.00	8.50	7.50	6.60

Composite Price Nov. 5, 1923, Finished Steel, 2.775c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets	Oct. 30, 1923, 2.755c. Oct. 9, 1923, 2.775c. Nov. 6, 1922, 2.446c. 10-year pre-war average, 1.689c.
These products constitute 88 per cent of the United States output of finished steel	

Composite Price, Nov. 5, 1923, Pig Iron, \$22.02 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham	Oct. 30, 1923, \$22.27 Oct. 9, 1923, 23.79 Nov. 6, 1922, 28.86 10-year pre-war average, 15.72
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activity in that direction has been largely of inquiry rather than of sales.

Steel prices in the main are well sustained. The American Sheet & Tin Plate Co. late last week opened its books for its first quarter tonnages of sheets and tin plate, reaffirming the present prices. The response has been good in tin plate, but rather feeble in sheets. That was rather to be expected, however, since independent mills desirous of maintaining mill operations continue to take black and galvanized sheet business at least \$2 below the Steel Corporation schedules. A 3c. base for cold-finished steel bars has become general since a week ago and 2.15c. has reappeared in light rails rolled from billets, while for hot-rolled strips a base price above 3c. refers usually to small and unimportant tonnages. The market continues in buyers' favor also on bolts, nuts and rivets, but prices on other products are very well maintained considering the moderate proportions of current purchases.

While the scrap market is slightly stronger on some

grades, primary materials generally still are weak and demand is so light as to suggest still lower prices. So little business is being done in pig iron that quotations for the most part are merely what producers are asking. There is practically no market in coal and coke. Sheet bars are held firmly at \$42.50, but this price impresses buyers as an artificial one, since demands are light and there is an unusually good profit at that price based on current scrap and pig iron costs. Billets and slabs are really easy.

Pig Iron.—An utter absence of important transactions renders difficult the determination of where prices really are. The most recent sale of basic iron, one of 1000 tons to a Sharon, Pa., melter, was at \$22, Valley furnace, but it is doubtful if that price could be done again, as available supplies are very heavy and consumers generally are taking only passive interest in the market. At least one middle interest is offering this grade with a silicon content, however, above 1 per cent at \$21, Valley furnace. Even that price is not

very interesting to melters, who now are looking for a price of \$20 before there is a turn in the market. Bessemer iron has sold at \$24.50, which, as in the case of basic, is a drop of 50c. a ton from last week's level. Foundry iron continues at \$22.50 for the base grade, but no important sales have been made lately at that price and it is believed that a firm offer of less would get serious consideration. Malleable iron is a good deal of a drug on the market, and hard to sell at any price. Four furnaces have gone on the idle list since a week ago. These include one Edgar Thomson furnace of the Carnegie Steel Co., the Soho furnace of the Jones & Laughlin Steel Corporation, No. 1 stack of the Shenango Furnace Co. and the stack of the Punxsutawney Furnace Co., Punxsutawney, Pa. The stack of the Struthers Furnace Co. has gone into blast after being banked for about two months. The furnace of the American Manganese Mfg. Co., Dunbar, Pa., which lately has been on spiegeleisen, will be blown out within the next few days. W. P. Snyder & Co. report the average price of Bessemer iron from Valley furnaces in October to have been \$25.20 against \$26.50 in September and on basic \$23.25 against \$24.50 in September.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being \$1.76 per gross ton:

Basic	\$22.00
Bessemer	24.50
Gray forge	22.00
No. 2 foundry	22.50
No. 3 foundry	22.00
Malleable	22.00
Low phosphorus, copper free	30.00

Ferroalloys.—Both domestic and British producers of ferromanganese still are quoting \$110, Atlantic seaboard, but evidently those who were in need of supplies for use between now and the end of the year were able to cover them from resale British offerings, as lately business has been very quiet. With the competition from resale offerings eliminated, however, the market is firm rather than otherwise at the quoted price. There is little activity in the other products under this heading and prices show no particular change. Prices are given on page 1277.

Semi-Finished Steel.—Sheet makers without regular sources of steel supplies are trying pretty hard to secure sheet bars at less than the generally quoted price of \$42.50, Pittsburgh or Youngstown. One Pittsburgh district sheet maker is offering \$40, Pittsburgh for 3000 tons, but thus far has not been able to find a mill willing to take the business. Makers who regularly supply non-integrated producers with sheet bars are disposed to decline business at less than \$42.50, not that a lower price would not yield a good profit, but because of the effect the lower price might have on prices of finished sheets. Billets and slabs readily are obtainable at \$40 and users do not have to go higher. With rolling billets available at \$40, makers find it hard to get more than \$45, base, for forging quality, \$5 being the ordinary differential between the two grades. Demand is light. Skelp and wire rods are plentiful and slow of sale, but recent quotations of 2.40c., and \$51, respectively, are well observed. Prices are given on page 1277.

Tubular Goods.—Some tapering in demand lately has been experienced in standard pipe and this division of the market now is not much more active as far as new business is concerned than oil well and line pipe. Most mills have fairly substantial backlogs in both classes of pipe, however, and expect a revival in demand before these orders are completed. Stocks of pipe in the oil producing districts are moderate and it is believed that on account of the sustained building activities, notably in house building, much of the standard pipe which has been going out has gone into use rather than into jobbers' warehouses. Recovery in the oil industry and the usual spring building activities, therefore, are expected to be felt very promptly by the mills. Price shading in pipe is practically unknown, but there is some cutting in boiler tubes, which are dull and some makers find it necessary to make attractive prices to round out their mill schedules. Discounts are given on page 1276.

Steel Rails.—Lower prices than 2.25c., base, for light rails rolled from billets have again appeared. It

is now evident that while that price is commonly quoted and obtained on small tonnages, attractive orders are bringing out quotations of 2.15c., base. These rails, accordingly, are quotable at 2.15c. to 2.25c. Light sections rolled from old standard sections, still are quotable from 1.85c. to 2c., base. General demand is moderate since the coal industry, the principal outlet for light rails, is operating at a very low rate and coal prices are too low to encourage fresh development work.

We quote light rails rolled from billets at 2.15c. to 2.25c. base (25-lb. to 45-lb.); rerolled rails, 1.85c. to 2c. base (12-lb. to 45-lb.), f.o.b. mill; standard rails, \$43 per gross ton mill, for Bessemer and open-hearth sections.

Wire Products.—There is a fairly good business, but generally, it is still the policy of jobbers and manufacturing consumers to buy frequently instead of a long time ahead. Most of the business on mill books being in the shape of orders instead of contracts, few are definitely committed for long periods and early deliveries are being promised on practically everything. Observance of quoted prices is fairly close. Prices are given on page 1276.

Cold-Finished Steel Bars and Shafting.—Three nearby makers recently advised the trade of a revision in the price to 3c., base, a reduction of \$5 a ton, the new price to apply on both new and unshipped orders. This change was effective Nov. 1, and since has been followed by other makers. The market now is quotable at 3c., base, for carload lots, with the usual extra of 25c. per 100 lb. for less than carload lots. There is a fair demand from the automotive industry, but business in general is moderate and leaves much to be desired. The reduction by local makers amounts to the meeting of competition from Chicago district mills, which several weeks ago went to 3c., Pittsburgh, in the Detroit district and with such a large part of the business originating in that territory, it was necessary for local mills to go to that price to hold their accounts there.

Hot-Rolled Flats.—The regular base of 3.15c., Pittsburgh, still is well observed on hoops, but on other products under this heading that price is largely a quotation, except on very small tonnages. Certainly, those who have fairly large tonnages of strips to place do not have to go above 3c., base, to secure them, which means that rim stock material for cold-rolling in large lots is obtainable at 2.85c. Business with practically all makers improved materially in October as compared with the month before, but there has been no evidence of a departure by consumers from a policy of covering their known requirements. The cotton tie season has closed. Prices are given on page 1276.

Colled-Rolled Strips.—October business gained appreciably over that of the month before with practically all makers, but October bookings for the most part ran to orders rather than contracts, the tendency of consumers being to keep their supplies well in line with their actual requirements. The improvement is largely ascribable to increased demands from the automobile parts makers. The price of 5c., base, Pittsburgh, is well maintained despite the decline in hot-rolled strips for cold-rolling since that price was announced in August.

Bolts, Nuts and Rivets.—Actual selling prices of bolts and nuts are still below published quotations; there has been no abandonment of these quotations, but it is admitted that they are not often realized. Inquiry and orders show some gain, but there is still too much idle capacity for the market to show much strength. Rivet prices still are soft and on large lots less than \$2.75 base is being done. Prices and discounts are given on page 1276.

Sheets.—The interesting development of the week is the announcement of the American Sheet & Tin Plate Co. of the opening of its books for first quarter of 1924 business at unchanged prices. These are 3.85c. base for black, 5c. base for galvanized, 3c. base for blue annealed and 5.35c. base (No. 22 gage) for automobile body sheets. There has been no rush of buyers to cover for that period and it would have been surprising if there had been, since there are several independent mills which continue to quote \$2 lower than the Steel Corporation bases and would not be adverse to taking

forward delivery business at the lower levels. Current demands are moderate and represent closely the actual needs of buyers. It is a buyers' market in a broad way, although some of the Youngstown district makers show a disposition to curtail operations rather than cut prices. All of the mills of the Republic Iron & Steel Co., Youngstown, are idle this week and that district as a whole is not operating much over 50 per cent of sheet mills' capacity. The leading interest is having an operation of about 80 per cent, but it is doubtful if shipments are that large. Prices are given on page 1276.

Tin Plate.—The leading interest is committed over the first half of next year as a result of orders that have come in following its announcement of the opening of its books for first quarter business at the former base of \$5.50 for that period. Its current business has been helped materially by the fact that it will produce over 200,000 base boxes for a large can company, the tin plate plant of which, located in this district, is to go down soon for a period of at least 60 days for necessary repairs. Independent plants in this district are getting near the end of their business for this year and there is a slight slowing down in operations. The leading interest has more than 85 per cent of its hot mills in operation.

Iron and Steel Bars.—Makers of steel bars in this district are holding with great tenacity to the base of 2.40c., although demands are small and most of the independent mills need business. A larger cut than makers feel justified in making would be necessary, it is held, to bring out really desirable orders. Iron bars are easier, reflecting both a light demand and the lower wage rate for the next 60 days resulting from the recent wage settlement.

We quote soft steel bars, rolled from billets, at 2.40c. base; bars for cold-finishing of screw stock analysis, \$3 per ton over base; reinforcing bars, rolled from billets, 2.40c. base; refined iron bars, 3.25c. base, in carload lots or more, f.o.b. Pittsburgh.

Structural Material.—Mills in this district are not experiencing large demands, chiefly because the fabricating shops here cannot compete with those in other parts of the country enjoying more reasonable steel prices. Furthermore, this is the quiet season in structural awards and while inquiries are reported to be numerous enough, awards are few and those on the few important jobs at prices so low as to suggest stocks of much steel bought at well below today's prices. Mills here, however, are holding to the base of 2.50c. Prices are given on page 1276.

Plates.—While inquiry for plates is brisk in connection with railroad business, actual orders are light and independent capacity is less fully engaged than at any time before this year. There is close adherence, however, to the base of 2.50c. Prices are given on page 1276.

Track Supplies.—Current activity is limited, but inquiry covering future deliveries is pretty heavy. Recent prices hold, but it is believed that competition for some of the big orders now up will result in lower prices. Quotations are given on page 1276.

Coke and Coal.—The spot market for Connellsville coke has virtually vanished and just where prices are is not easily determined in the absence of sales. The nominal quotation still is \$3.75 per net ton at oven, but there are a great many loaded cars which have been lying on track for several days for want of a place to ship. Some of these holdings undoubtedly could be had pretty cheap. Curtailment of production continues and apparently the end of the movement has not yet been reached; nevertheless there are ample supplies and the danger of higher prices seems remote, since there are some plants which cannot be shut down except at greater loss than by selling at the market valuations. Foundry coke still is readily available at from \$4.75 to \$5.25. The one bit of contract business in furnace grade recently before the market, that of the Struthers Furnace Co. for 15,000 tons a month for five months beginning Nov. 1, was placed with the Youngstown Sheet & Tube Co. at a price equal to slightly more than \$3.50 at Connellsville. There has been no improvement in the coal market, which is dull

and weak at from \$1.45 to \$2.10 per net ton at mine for mine run steam coal, \$2 to \$2.25 for coaking coal and \$2.25 for gas grade.

Old Material.—The market reflects a somewhat stronger undertone, although real activity still is lacking and the stronger price ideas of dealers find explanation in expectations of purchases rather than in actual buying. A local steel company which has been embargoed is said to be granting permits for shipments a little more readily than formerly; this is taken to mean that this company is not as well off with regard to supplies as it has been. Other mills have raised their bids slightly and the big spread between scrap and pig iron and the improvement in steel business in October as compared with September also are advanced by those now bullish on the market. It is claimed that \$16.50 has been offered for heavy melting steel, but there is no evidence that a sale has been made at that price. Some observers say that the effort to advance prices is nothing more than a repetition of the unsuccessful effort of late August and early September and that those responsible are those who have their yards full and want to move some of their holdings. It cannot be said that the outlook is brilliant for heavier steel works operations over the remainder of the year and the foundries in this district as a general rule are beginning to feel the absence of fresh railroad buying. It must be said that relatively high prices were obtained on railroad scrap offerings in view of the fact that they were so heavy. Heavy melting steel sold up to \$16 and material for throwing down in the yards sold above \$10 in some instances. Heavy melting steel at \$15 is out of the question this week and definitely higher bids have appeared from users of turnings.

We quote for delivery to consumers' mill in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows:

Per Gross Ton	
Heavy melting steel.....	\$15.50 to \$16.00
No. 1 cast, cupola size.....	18.50 to 19.00
Rails for rolling, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va. and Franklin, Pa.	17.50 to 18.00
Compressed sheet steel.....	14.00 to 14.50
Bundled sheets, sides and ends..	12.50 to 13.00
Railroad knuckles and couplers..	18.00 to 18.50
Railroad coil and leaf springs..	18.00 to 18.50
Low phosphorus blooms and billet ends	20.50 to 21.00
Low phosphorus plate and other material	18.50 to 19.00
Railroad malleable	19.00 to 19.50
Steel car axles	19.00 to 19.50
Cast iron wheels	17.50 to 18.00
Rolled steel wheels	18.00 to 18.50
Machine shop turnings.....	11.00 to 11.50
Sheet bar crops.....	16.50 to 17.00
Heavy steel axle turnings.....	13.50 to 14.00
Short shoveling turnings.....	12.50 to 13.00
Heavy breakable cast	14.50 to 15.00
Stove plate	14.00 to 14.50
Cast iron borings.....	12.50 to 13.00
No. 1 railroad wrought.....	13.00 to 13.50
No. 2 railroad wrought.....	15.50 to 16.00

Trumbull Steel Co. Record

YOUNGSTOWN, Nov. 6.—In October the Trumbull Steel Co. at Warren established a new high monthly record in ingot output, producing 44,212 tons, as compared with its previous high production of 43,001 tons in June last. Present indications are that the company may surpass in November its October production.

Last month the Trumbull company shipped 33,391 tons of finished steel products at an annual rate in excess of 400,000 tons.

Enrollment in vocational schools in Wisconsin during the past year amounted to more than 52,000 children and adults, a report of the director of vocational education reveals. Of this number 35,845 pupils were enrolled in day classes and 26,665 in night classes. The Milwaukee schools had an enrollment of 40 per cent of the total, with 13,098 in day classes and 7005 in night classes, a total of 20,103. Eighteen Wisconsin cities conduct vocational schools. The Racine school ranked next to Milwaukee with 2906 pupils; La Crosse third with 2437; Madison fourth with 2288 and Kenosha fifth with 2234.

Chicago

October Records Improvement Over September—More Optimistic Sentiment

CHICAGO, Nov. 6.—Generally speaking, new business and specifications against contracts received by local mills in October showed an encouraging increase over bookings in September. While new commitments are still smaller than current shipments, the gap between the two has been slowly closing and producers are taking a more hopeful view of the future. Outside of orders for rails and track supplies, however, new business is still confined almost entirely to purchases for nearby delivery. For this reason some observers have not yet abandoned the belief that the mills will be forced to curtail operations materially before the close of the year. In fact it is said that curtailment of production would be preferred by some interests to an abandonment of present prices. Price reductions generally beget further price recessions and the experience of producers in 1921 and early 1922 was so unfortunate that it is a question whether they care to risk a repetition following the recent increase in costs through the elimination of the 12-hour day. Of course, it is hazardous to attempt to forecast the attitude of mills toward a situation which has not yet materialized. Suffice it to say they will not cross the stream until they reach it, and in the meantime they are encouraged by a gradual increase in new business and by the prospect of heavier buying by the railroads. The report persists that not only the Southern Pacific, but the New York Central, the Pennsylvania and other lines will soon enter the market for a total of fully 80,000 cars. The only inquiries of any size which have come into the market during the week, however, are 2000 gondola cars for the Chesapeake & Ohio and 1750 automobile cars for the Wabash.

Mill and furnace operations in this district show a slight loss. The Illinois Steel Co. has blown out a furnace for relining at South Works, leaving 22 out of its 27 steel works stacks in blast. Its steel output has receded to slightly less than 90 per cent of ingot capacity. The Inland Steel Co. remains on a 75 per cent basis.

Pig Iron.—While actual sales are still light, melters are beginning to manifest more interest in their future supplies and some of them are feeling out the market for their first quarter requirements. An inquiry from a northern Illinois melter calls for 800 tons of foundry for first half. An inquiry from a stove manufacturer calls for several hundred tons of foundry for first quarter. While there have been a few sales for first quarter, the tonnage involved has been negligible and the transactions have been significant largely because they represented the first purchases for that delivery. Prominent among other sales may be mentioned 500 tons of foundry bought by a Michigan user for delivery over the remainder of the year and an equal tonnage of malleable purchased by another Michigan melter for similar shipment. An Indiana melter is inquiring for 1000 tons of malleable for delivery in November and December. While the market is still weak, no important developments in prices have occurred during the week.

Quotations on Northern foundry high phosphorus malleable and basic irons are f.o.b. local furnace and do not include an average switching charge of 61c. per ton. Other prices are for iron delivered at consumer's yard or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago...	\$29.15 to \$30.15
Northern coke, No. 1, sil. 2.25 to 2.75	24.50
Northern coke, foundry, No. 2, sil. 1.75 to 2.25	24.00
Malleable, not over 2.25 sil....	24.00
Basic	24.00
High phosphorus	24.00
Southern No. 2	24.75 to 25.51
Low phos., sil. 1 to 2 per cent, copper free	33.25 to 34.00
Silvery, sil. 8 per cent	37.29

Ferroalloys.—A sale of 100 tons of 18 to 22 per cent spiegeleisen has been negotiated at \$38, furnace, or the equivalent of \$43.80, delivered Chicago. Sixteen to 18

per cent spiegeleisen has been sold at as low as \$35, furnace. We note the sale of a carload of 50 per cent ferrosilicon at \$82, delivered. Ferromanganese is available at as low as \$108, Eastern seaboard.

We quote 80 per cent ferromanganese, \$116.38 to \$117.56, delivered; 50 per cent ferrosilicon, \$82, delivered; spiegeleisen, 18 to 22 per cent, \$43.80, delivered.

Cast-Iron Pipe.—Chicago has awarded 570 tons of 8-in. water pipe to the United States Cast Iron Pipe & Foundry Co. Duluth has placed 100 tons with the Lynchburg Foundry Co. Richard Burrell, Joliet, Ill., has the general contract for 200 tons for that city. Pleasant Ridge, Mich., takes bids today on 200 tons of 6- and 8-in. water pipe. There have been no new price developments.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., \$60.20; 6-in. and above, \$56.20; class A and gas pipe, \$5 extra.

Plates.—New inquiries from the Wabash, the Chesapeake & Ohio and the Great Northern involve 4500 cars, which will require 50,000 tons of rolled steel. It is expected that a substantial portion of this tonnage will be placed with local mills. It is reported that the Magnolia Petroleum Co. has placed a number of oil storage tanks for the Powell field in Texas and that the Standard Oil Co. has bought a number for Casper, Wyo., but details are withheld.

The mill quotation is 2.60c., Chicago. Jobbers quote 3.30c. for plates out of stock.

Structural Material.—While lettings for the week showed an increase, inquiries have fallen off, and the anxiety of fabricators for new tonnage is being reflected in sharp price concessions. In some quarters, however, this is believed to be a temporary condition in view of the large amount of work on architects' boards. Bids on the New Palmer House, Chicago, involving 12,000 tons, are expected to be asked about Jan. 1. Building permits issued in Chicago in October were approximately equal to those of September and nearly twice as large as those of October, 1922, in terms of total investment involved. Plain material prices are unchanged.

The mill quotation on plain material is 2.60c., Chicago. Jobbers quote 3.30c. for plain material out of warehouse.

Sheets.—Both the leading producer and the local independent have reaffirmed their prices for first quarter delivery, ignoring the lower prices of the smaller mills. Buying shows no material increase and price recessions by the smaller interests are more common. On black sheets as low as 3.65c. base, Pittsburgh, has been done, and on galvanized 4.85c. has been named.

Mill quotations are 3.75c. to 3.85c. for No. 28 black, 3c. for No. 10 blue annealed and 4.90c. to 5c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of 34c. per 100 lb.

Jobbers quote, f.o.b. Chicago, 4c. for blue annealed, 4.70c. for black and 5.85c. for galvanized.

Bars.—Orders for soft steel bars are more numerous, but in practically all instances involve small tonnages for early shipment. Continued caution on the part of buyers is indicated by the fact that they still refrain from contracting very far ahead. New business in bar iron is so light that mills find it difficult to maintain even partial operations. Orders for rail steel bars have shown some improvement, but mills are still running on a hand-to-mouth basis. Prices on all three classes of bars remain unchanged.

Mill prices are: Mild steel bars, 2.50c., Chicago; common bar iron, 2.40c., Chicago; rail steel, 2.30c., Chicago mill.

Jobbers quote 3.20c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 4.55c. for rounds and 5.05c. for flats, squares and hexagons.

Jobbers quote hard and medium deformed steel bars at 2.75c. base; hoops, 4.55c.; bands, 3.95c.

Rails and Track Supplies.—The Nickel Plate has distributed an order for 18,000 tons of rails between the Illinois, Carnegie, Bethlehem and Inland companies. The Monon has ordered 4000 tons of rails from the Illinois Steel Co. The Southern Railway is inquiring for 35,000 tons of rails. The Pennsylvania has not yet placed orders for 200,000 tons. The Southern Pacific has ordered 10,000 kegs of spikes from a local company. Other orders for track supplies

booked by local mills include 6000 kegs of bolts and 2400 tons of splice bars. A Chicago railroad which recently suspended delivery on 2700 tons of tie plates has released the entire tonnage for shipment. Another line which placed what it believed were its entire rail requirements a month ago, has ordered 1500 tons additional.

Standard Bessemer and open-hearth rails, \$43; light rails, rolled steel, 2.25c. f.o.b. makers' mills.

Standard railroad spikes, 3.25c. mill; track bolts with square nuts, 4.25c. mill; iron tie plates, 2.75c. mill; steel tie plates, 2.60c., f.o.b. mill; angle bars, 2.75c., f.o.b. mill.

Jobbers quote standard spikes out of warehouse at 3.90c. base, and track bolts, 4.90c. base.

Wire Products.—Although specifications are still light, buyers are showing greater interest in the market, suggesting that some of them are recovering confidence in the stability of present prices. Improved conditions in the Northwest are reflected in better sales by jobbers serving that section of the country. Mill prices, which are unchanged, are shown on page 1276.

We quote warehouse prices f.o.b. Chicago; No. 6 to No. 9 bright basic wire, \$3.90 per 100 lb.; extra for black annealed wire, 15c. per 100 lb.; common wire nails, \$3.50 per 100 lb.; cement coated nails, \$3.25 per keg.

Bolts and Nuts.—With buyers holding back their purchases, competition among sellers is keen and discounts are exceedingly soft. In fact, the lack of price stability is discouraging buying.

Jobbers quote structural rivets, 4c.; boiler rivets, 4.20c.; machine bolts up to $\frac{3}{4}$ x 4 in., 45 and 5 per cent off; larger sizes, 45 and 5 off; carriage bolts up to $\frac{3}{4}$ x 6 in., 40 and 5 off; larger sizes, 40 and 5 off; hot pressed nuts, squares and hexagons, tapped, \$2.50 off; blank nuts, \$2.50 off; coach or lag screws, gimlet points, square heads, 50 and 5 per cent off.

Reinforcing Bars.—While there were few sizable lettings of reinforcing bars during the week, sellers are encouraged by the prospective business which has appeared. A new office building for the Santa Fe at Topeka, Kans., will require 750 tons. The placing of the general contract for the Knights of Columbus club house, Chicago, forecasts an early purchase of the concrete bars, amounting to 400 tons. Considering the decline in the volume of business booked during the past few weeks, warehouse prices are surprisingly steady at 2.75c., Chicago. Occasional concessions are still reported, however. Lettings include:

Garage for Cork Motor Car Co., Marquette, Mich., 100 tons to Corrugated Bar Co.

State Teachers' College building, Winona, Minn., 250 tons to Kalman Steel Co.

Empire State Ice Co. building, Albany, N. Y., 150 tons to Corrugated Bar Co.

Vassar Swiss Underwear Co. plant, Chicago, 150 tons to Barton Spiderweb System Co.

Pending business includes:

Atchison, Topeka & Santa Fe R. R., office building, Topeka, Kans., 750 tons.

Knights of Columbus Club house, Chicago, 400 tons, general contract awarded to Duffy & Noonan, Chicago.

Wayne Medical Building, Ft. Wayne, Ind., 175 tons, bids taken.

Goodman Mfg. Co. plant addition, Chicago, 180 tons, new figures asked.

Shrine temple, Ft. Wayne, Ind., 200 tons.

Armory for One Hundred Twenty-second Field Artillery, Chicago, 200 tons.

Coke.—Local by-product foundry coke has been reduced \$1 a ton to \$12.50 delivered in the Chicago switching district.

Old Material.—Consumer buying remains at a standstill and while the activities of dealers are still limited, some of them are commencing to speculate on an advance in the market with the result that the decline in prices has been halted. Transactions involving early deliveries, however, indicate that going prices are unchanged from a week ago. Railroad offerings include the Chicago & Eastern Illinois, 1200 tons; the Pullman Co., 1000 tons; the Pere Marquette, 500 tons, and the Soo Line, 300 tons. Through a typographical error, rails for rolling were incorrectly quoted in the issue of

Nov. 1. They should have carried a price range of \$14.50 to \$15 per gross ton.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Iron rails	\$19.50 to \$20.00
Cast iron car wheels	17.50 to 18.00
Relaying rails, 56 and 60 lb.	26.00 to 27.00
Relaying rails, 65 lb. and heavier	32.00 to 35.00
Rolled or forged steel car wheels	17.00 to 17.50
Railroad tires, charging box size	17.50 to 18.00
Railroad leaf springs, cut apart	17.50 to 18.00
Rails for rerolling	14.50 to 15.00
Steel rails, less than 3 ft.	16.00 to 16.50
Heavy melting steel	13.50 to 14.00
Frogs, switches and guards cut apart	13.50 to 14.00
Shoveling steel	13.25 to 13.75
Drop forge flashings	9.00 to 9.50
Hydraulic compressed sheets	11.00 to 11.50
Axle turnings	10.50 to 11.00
Steel angle bars	15.00 to 15.50

Per Net Ton	
Iron angle and splice bars	17.50 to 18.00
Iron arch bars and transoms	17.50 to 18.00
Iron car axles	23.50 to 24.00
Steel car axles	15.00 to 15.50
No. 1 busheling	10.00 to 10.50
No. 2 busheling	7.00 to 7.50
Cut forge	12.00 to 12.50
Pipes and flues	8.00 to 8.50
No. 1 railroad wrought	12.00 to 12.50
No. 2 railroad wrought	12.00 to 12.50
Steel knuckles and couplers	15.50 to 16.00
Coil springs	17.00 to 17.50
No. 1 machinery cast	18.00 to 18.50
No. 1 railroad cast	17.50 to 18.00
No. 1 agricultural cast	17.50 to 18.00
Low phos. punchings	14.00 to 14.50
Locomotive tires, smooth	15.00 to 15.50
Machine shop turnings	6.50 to 7.00
Cast borings	8.50 to 9.00
Short shoveling turnings	8.50 to 9.00
Stove plates	15.00 to 15.50
Grate bars	14.00 to 14.50
Brake shoes	15.00 to 15.50
Railroad malleable	16.50 to 17.00
Agricultural malleable	16.00 to 16.50

TAX BURDEN DOUBLES IN DECADE

Figures Cited by National Industrial Conference Board in Growth of Cost of Government

Remarkable growth in the increasing burden of taxation in the United States is revealed in a report just made public by the National Industrial Conference Board, New York, which represents the results of a year's study by the board's research staff of the whole problem of the cost of government to the people. Of almost equal importance, the board cites the constantly rising amount of property which has been rendered by various means exempt from taxation, and the value of which, in round figures, is given as \$54,000,000,000 in 1922. "This stupendous sum," says the report, "represents slightly less than one-fifth of our national wealth, and is equal roughly to one-third of all property assessed under the general property tax which forms the bulwark of State and local government finance."

Summarizing the growth of the country's tax bill, the report shows that the nation paid last year in taxes \$7,061,000,000, compared with \$8,363,000,000 in 1921, \$2,194,000,000 in 1913, and \$1,382,000,000 in 1903. In 1922 the taxes collected by the Federal Government showed a decline of \$1,526,000,000 as compared with 1921. This is ascribed to the reduction of income taxes due to the low ebb of business in 1921.

On the other hand, taxes of State and local governments continued to mount. State taxes increased from \$307,000,000 in 1913 to \$846,000,000 in 1922. Likewise local taxes rose from \$1,219,000,000 in 1913 to \$3,301,000,000 last year. This rising ratio of taxation to the National income is also shown by the statement that it was 6.4 per cent in 1913, 12.1 per cent in 1919, 16.7 per cent in 1921 and 12.1 per cent in 1922.

The tax burden, figured in terms of each person's income, is also cited to bear out the board's conclusions. The total tax bill last year was \$64.63 per capita, as compared with \$17.07 per capita in 1913. This represents, as gaged by income, the result of six and one-quarter weeks' work in 1922 for taxes as compared with three and a third weeks' work before the war.

"In a nutshell," says the board, "all taxes stated in dollars were in 1922 about three and one-half times as high as they were in 1913 and twice as burdensome."

New York

Some Railroad Equipment Buying—Wide Variation in Pig Iron Prices

NEW YORK, Nov. 6.—Sales of pig iron the latter part of last week and the first part of this week have been, as a rule, small in tonnage, but the number has been encouraging and the prices in eastern Pennsylvania on the ordinary run of business have been considerably above what had been done on a round tonnage and probably could be done again. The eastern Pennsylvania price on small tonnages is \$23 furnace for No. 2 plain or No. 2 X, while \$22.50 is done on somewhat larger tonnages and probably the \$21 price made in at least one case last week could be repeated on tonnages running from 2000 to 5000. At Buffalo \$21 for No. 2 plain or No. 2 X is the usual quotation. Pending inquiries include one for from 2500 to 3000 tons for the remainder of this year for an upper New England melter, one for 1000 tons, fourth quarter, from the same part of New England, and one for from 2000 to 4000 tons, fourth quarter, from a company having plants in New Jersey and Pennsylvania, all being foundry iron. Further curtailment of melt is reported in lower New England, where buyers of castings are clamoring for lower prices owing to recent declines in pig iron quotations.

We quote delivered in the New York district as follows, having added to furnace price \$2.27 freight from eastern Pennsylvania, \$4.91 from Buffalo and \$5.44 from Virginia:

East. Pa. No. 1X fdy., sil. 2.75 to 3.25....	\$24.77
East. Pa. No. 2X fdy., sil. 2.25 to 2.75....	24.27
East. Pa. No. 2, sil. 1.75 to 2.25.....	24.27
Buffalo, sil. 1.75 to 2.25.....	\$27.41 to 26.91
No. 2X Virginia, sil. 2.25 to 2.75.....	29.94
No. 2 Virginia, sil. 1.75 to 2.25.....	29.44

Ferromanganese.—New business is limited to fairly frequent sales of carload lots of both British and domestic alloy at prevailing quotations which are being sent to steel producers who are buying as the need arises. It is stated that earlier in the year very few consumers purchased ferromanganese for delivery beyond the third quarter. There has been no change in prices in the last week. Demand for spiegeleisen is also hand-to-mouth with the price situation steady. Steel consumers are buying only such quantities of 50 per cent ferrosilicon as they need for filling in requirements at prices ranging from \$82.50 to \$87, delivered.

Cast-Iron Pipe.—In general prices are unchanged, although some concessions are reported made by a few shops. Appearance of inquiries from many large gas companies for water pipe on next year's requirements is the cause of some optimism. On the tender for 350 tons of 6-in. and 8-in. water pipe from Katonah, N. Y., bids on which were opened Nov. 1, R. D. Wood & Co. were the low bidders. The city of Boston has asked for about 500 tons of 8-in. to 16-in. water pipe, opening Nov. 7. We quote per net ton, f.o.b. New York, in carload lots, as follows: 6-in. and larger, \$63.60; 4-in. and 5-in., \$68.60; 3-in., \$78.60, with \$5 additional for Class A and gas pipe. Soil pipe makers are looking forward to continued activity. Present business for prompt shipment is on a basis of 40% for light and 50% for heavy pipe, and jobbers are showing an inclination to place orders for next year's delivery at these discounts. Makers, however, are refraining from action, expecting a recovery of prices on 1924 business. We quote discounts of both Southern and Northern makers, f.o.b. New York, in carload lots, as follows: 6-in., 40% per cent off list; heavy, 50% per cent off list.

Warehouse Business.—A general weakness of prices continues through many products. Cold-rolled shafting was reduced on Nov. 1 to 4.40c. for rounds and 4.90c. for squares, flats and hexagons, by most sellers in this district. At the same time the mill price was reduced to 3c. base, Pittsburgh. Black and galvanized sheets show no tendency to stiffen, although a fairly active demand is reported. Blue annealed sheets continue weak. Prices on Swedish charcoal iron bars have fluctuated considerably of late, but a fair estimate of

the present market is still 7c. to 7.25c. per lb. base. We quote prices on page 1302.

Finished Iron and Steel.—Car equipment orders and sustained activity in structural steel are the factors of the week. Buyers are trying to secure reductions but producers are stiff in respect to prices, save in a few cases. For example, all of the makers of cold-finished steel bars are now on a 3c., Pittsburgh, base. There have been sales at this figure for some time, but those makers who have been holding out for 3.25c. are now down to the lower level. Re-rolled concrete bars are being sold at prices ranging from 2.25c. to 2.35c. Export orders are going at a little less. Black sheets at 3.75c. are easily available, galvanized at 4.90c., while blue annealed continues fairly firm at 3c.

We quote for mill shipments, New York delivery, as follows: Soft steel bars, 2.74c.; plates and structural shapes, 2.74c. to 2.84c.; bar iron, 2.74c.

Coke.—The market is substantially the same as last week, drastic curtailment of production having thus far maintained fairly firm prices. Still further reduction of ovens in operation is expected if prices are to hold. Standard foundry is quoted at \$5 to \$6.25 per ton. Standard furnace ranges from \$3.75 to \$4.25 per ton. Contracting for shipment next year of by-product coke on the "open-price" basis is reported to have been fairly heavy since the recent reduction. By-product coke is quoted at \$10.91, Newark and Jersey City, N. J.

Old Material.—Plenty of scrap is reported available and prices continue weak, with \$14.50 per ton the prevailing price delivered eastern Pennsylvania consumers for both No. 1 and railroad grade of heavy melting steel. Lack of transactions makes it difficult to establish more than nominal prices on most grades. Borings and turnings are unchanged. Some tonnage is reported going to Wierton, W. Va., at \$12.50 per ton. Stove plate is holding at \$16.25 per ton delivered Harrisburg, Pa., and slightly lower prices delivered to New Jersey consumers. The Steel Scrap Co. of Philadelphia, formed by Luria Brothers & Co. and Perry, Buxton, Doane Co., to acquire the battleships disposed of by the United States Government, in addition to the high bid on two ships at Philadelphia was high bidder at \$9.51 per ton broken to shipping sizes, on the "Indiana" and "South Dakota" at the Brooklyn Navy Yard.

Buying prices per gross ton New York follow:

Heavy melting steel, yard....	\$10.50 to \$11.00
Steel rails, short lengths, or equivalent	11.50 to 12.00
Rails for rolling.....	15.00 to 16.00
Relaying rails, nominal.....	25.00 to 26.00
Steel car axles.....	15.00 to 16.00
Iron car axles.....	22.50 to 23.00
No. 1 railroad wrought.....	13.00 to 13.50
Wrought iron track.....	13.00 to 13.50
Forge fire	8.00 to 8.50
No. 1 yard wrought, long.....	12.00 to 12.50
Cast borings (clean).....	7.50 to 8.00
Machine-shop turnings	7.00 to 7.50
Mixed borings and turnings....	7.00 to 7.50
Iron and steel pipe (1 in. diam., not under 2 ft. long).....	9.75 to 10.25
Stove plate	12.25 to 12.75
Locomotive grate bars.....	12.00 to 12.50
Malleable cast (railroad).....	16.00 to 17.00
Cast-iron car wheels.....	15.00 to 15.50

Prices which dealers in New York and Brooklyn are quoting to local foundries per gross ton follow:

No. 1 machinery cast.....	\$19.00
No. 1 heavy cast (columns, building materials, etc.), cupola size.....	18.00
No. 1 heavy cast, not cupola size.....	14.50
No. 2 cast (radiators, cast boilers, etc.)..	16.00

More Hopeful Feeling at Youngstown

YOUNGSTOWN, Nov. 6.—District Independent Steel Rollers are reaffirming sheet and tin plate prices for the first quarter of 1924, following action by the American Sheet & Tin Plate Co. The naming of 1924 prices, coincident with the improved sentiment in business, is expected to stimulate buying for forward needs.

Steel makers are inclined to believe that a turning point has been reached in the recent sluggish steel market, and that business will improve more rapidly in the next few weeks than it has in the past. It is also hoped that start of buying of sheets and tin plate will be communicated to other steel products.

Buffalo

Lower Quotations on Pig Iron Sheet Prices for First Quarter

BUFFALO, Nov. 6.—The price of \$21 for No. 2 plain iron has been shaded in a few transactions; this and the fact that several Buffalo furnaces heretofore holding aloof from price concessions are now quoting \$21 for silicon 1.75 to 2.25, are the two elements indicative of further weakening here. New York State foundries are slowing down operations and even buyers in need of iron are withholding their purchases expecting further weakness. A number of buyers predict a price of \$20 as close at hand. Some of the inquiries of recent days are tentative; no specific tonnages are mentioned and the inquiries are feelers for prices on spot and first quarter delivery. Differentials do not figure to any extent. About 10,000 tons of new business represents the total activity of all sellers.

We quote f.o.b. gross ton, Buffalo as follows:

No. 1 foundry, sil. 2.75 to 3.25...	\$22.00 to \$22.50
No. 2 foundry, sil. 2.25 to 2.75...	21.50 to 22.00
No. 2 plain, sil. 1.75 to 2.25...	21.00 to 21.50
Basic	22.00
Malleable	23.00
Lake Superior charcoal.....	30.28

Finished Iron and Steel.—New prices on tin plate, cold-rolled material and sheets are announced, but it is too early to determine their reception with buyers. Following the lead set by the Steel Corporation, the local sheet mill has announced a price of 3.85c. on black sheets for first quarter delivery. Spot shipment sheets can be obtained at a lower figure. General interest on the part of tin plate buyers prior to the announcement of price schedules would tend to indicate a liberal placement of tonnages within a few days. Bars are holding firm at 2.40c. An independent office finds an increase in the number of orders, but a slowing down in the size of tonnages placed. Sheet demand is extremely weak for prompt shipment and first quarter business is yet to be placed.

We quote warehouse prices Buffalo as follows:
Structural shapes, 3.65c.; plates, 3.65c.; soft steel bars, 3.55c.; hoops, 4.65c.; bands, 4.35c.; blue annealed sheets, No. 10 gage, 4.45c.; galvanized steel sheets, No. 28 gage, 6.35c.; black sheets, No. 28 gage, 5.25c.; cold rolled round shafting, 4.70c.

Old Material.—What little activity characterized this market in earlier weeks seems to have disappeared. Some little demand for turnings and borings was maintained by blast furnace interests but continued weakness in pig iron has impaired this call. While all quotations are nominal, heavy melting steel can be obtained for \$14. A few dealers are stocking up in anticipation of a turn but not on a large scale.

We quote f.o.b., gross ton, Buffalo as follows:

Heavy melting steel.....	\$14.50 to \$15.50
Low phos., 0.04 and under.....	21.00 to 22.00
No. 1 railroad wrought.....	14.00 to 15.00
Car wheels	16.50 to 17.00
Machine shop turnings	8.50 to 9.50
Cast iron borings	13.00 to 13.50
No. 1 busheling	14.50 to 15.00
Stove plate	17.00 to 17.50
Grate bars	16.00 to 16.50
Bundled sheet stampings	8.00 to 9.00
No. 1 machinery cast.....	19.50 to 20.50
Hydraulic compressed.....	14.50 to 15.50
Railroad malleable	18.50 to 19.00

Birmingham

Small Lot Sales of Pig Iron at Low Prices—Deliveries Promptly Made

BIRMINGHAM, ALA., Nov. 6.—Small-lot sales of pig iron still predominate but recently the aggregate began showing up better and furnace interests are reporting more than production being sold. The quotations are still weak, though furnace companies say there has been some improvement. No. 2 foundry is being quoted at \$21 and \$22 per ton, the latter price for the home melters. However, reports from the Middle West are that \$20 is still being done here. Denial is made that sales have been made on a \$19.50 per ton base though

there was some admission that differentials in silicon content were conceded and this may have brought about the 50c. estimated reduction in price. Deliveries are prompt as railroads are in position to handle any and all business of the furnaces. The home melt is not as strong as it has been, some lagging being noted in the sanitary pipe plants. The pressure pipe plants are still receiving small lettings from week to week and added to the business still on books will have steady operations through the winter.

We quote per gross ton f.o.b. Birmingham district furnace as follows:

Foundry, silicon 1.75 to 2.25....	\$19.50 to \$21.00
Basic	20.00 to 21.00
Charcoal, warm blast.....	33.00

Cast Iron Pipe.—The American Cast Iron Pipe Co. has orders for pipe from Fort Worth and Dallas, Tex., the two orders amounting to around 808 tons. The United Cast Iron Pipe & Foundry Co. also received some small lettings during the week.

Finished Material.—The steel mills of the Birmingham district are doing fairly well. The rolling mills of the Tennessee Coal, Iron & Railroad Co. are down and there has been some lagging in the big steel plant at Ensley. Steel bar quotations remained unchanged at 2.60c. and demand light.

Coal and Coke.—Coal demand is fair only in this district and with exception of furnace company operations the average is about four days the week. Steam coal demands are lagging. Domestic coal demands are good but steam coal predominates the market. Coke is quoted \$5.50 for foundry and \$4.75 to \$5 for furnace.

Scrap Iron and Steel.—With the exception of a little No. 1 cast, there is very little being done in the scrap iron and steel market in the Birmingham district. The quotations continue weak, no change being reported in the last two weeks. One of the largest dealers in this district announces that he will lay in stock for the coming year, expectations being for a sudden need for various products. Heavy melting steel is standing still.

We quote per gross ton f.o.b. Birmingham district yards, nominal prices, as follows:

Cast iron borings, chemical....	\$18.00 to \$19.00
Heavy melting steel.....	14.00 to 15.00
Railroad wrought	15.00 to 16.00
Steel axles	19.00 to 20.00
Iron axles	23.00 to 24.00
Old steel rails.....	16.00 to 17.00
No. 1 cast.....	19.00 to 20.00
Tram car wheels.....	18.00 to 19.00
Car wheels	17.00 to 18.00
Stove plate	16.00 to 17.00
Machine shop turnings.....	8.00 to 9.00
Cast iron borings.....	9.00 to 10.00

Cleveland

Pig Iron Prices Marked Down—Heavy Tonnage Required for Ford Steel Plant

CLEVELAND, Nov. 5.—Iron ore shipments for October amounted to 8,099,716 gross tons as compared with 9,095,981 tons during September. In October, 1922, shipments were 6,081,386 tons. The movement until Nov. 1 was 54,088,561 tons as compared with 39,192,624 tons during the same period last year or a gain of 38 per cent. If weather conditions are favorable, the November movement will be close to 4,000,000 tons, making shipments for the season approximately 58,000,000 tons. The Steel Corporation has a shipping schedule for the month of 2,000,000 tons and plans to keep its boats in operation until Nov. 20.

Pig Iron.—Prices have further declined in Cleveland and the surrounding districts and the market continues weak. Sales during the week were light, much of the business being in car lots for early shipment, although a few lots of 500 tons and over were placed, in some cases for the first quarter. Locally prices have declined \$1 a ton to \$23 at furnace for foundry and malleable iron for Cleveland delivery. In the absence of sales of any size, prices are not definitely established for outside shipment, but a fair sized inquiry would probably bring out a \$22 quotation. In the Mahoning Valley district, small lot sales have been made at \$22.50, but this could probably be shaded 50c. on a desirable inquiry. The Buffalo situation continues very weak and

this appears to be affecting the price situation in this territory more than anything else. Buffalo iron is being offered in this territory, but no sales are reported. The Buffalo market seems now to be around \$21.50, although there are reports that quotations under \$21 have been made in the East. Consumers are closely watching the market and there are indications that there will be a fair volume of activity as soon as they are satisfied that prices have reached bottom. However, at present there is no evidence that the bottom has been reached. Steel making grades are inactive. While the last sale of basic iron reported was at \$22.50, the market is now not above \$22 and Pittsburgh brokers are reported to be offering basic at \$21.50.

Quotations below, except on basic and low phosphorus iron, are delivered Cleveland, and for local iron include a 50c. switching charge. Ohio silvery and Southern iron prices are based on a \$3.02 freight rate from Jackson and \$6 rate from Birmingham:

Basic, Valley furnace.....	\$22.00
Northern No. 2 fdy., sil. 1.75 to 2.25.....	23.50
Southern fdy., sil. 1.75 to 2.25.....	25.50
Malleable	23.50
Ohio silvery, 8 per cent.....	35.52
Standard low phos., Valley furnace.....	30.00

Sheets.—The announcement of the American Sheet & Tin Plate Co. that its present price will continue through the first quarter does not seem to have the effect of making the market any firmer. In fact, the weakness in black sheets appears more in evidence and some mills are shading the 3.75c. price. In some cases full finished sheets in heavier gages are being quoted on the blue annealed base, which makes the price equivalent to a 3.60c. black sheet base. Blue annealed sheets continue firm. Demand for sheets is light.

Semi-Finished.—Some of the smaller sheet mills owing to reduced operations are not taking sheet bars to the extent of their contracts and some mills have curtailed production. There is no new demand, but the market appears firm at \$42.50. A local inquiry for 500 tons of forging billets is understood to have brought out a quotation under \$47.50 delivered.

Bolts, Nuts and Rivets.—The demand for bolts, nuts and rivets is slow and prices are not firm. Concessions of 5 per cent above the regular discount have appeared on machinery and carriage bolts, mostly for the larger sizes. Regular quotations represent ruling rivet prices. New price lists on stove bolts were placed in effect Nov. 1. In these, bolts 7/32 in. in diameter and all diameters larger than 1/2 in. have been eliminated and on several sizes 6 in. is the maximum length listed instead of 6 3/4 in. as heretofore. This list finishes the issuing of new price lists started several weeks ago.

Finished Iron and Steel.—Demand for steel continues light and buying is mostly in small lots for early shipment. Some inquiry for steel bars for delivery around the first of the year has come from consumers whose stocks are running low, but who do not want to increase these before inventory time. Some good sized orders were placed during the week by Detroit automobile manufacturers. An Ohio manufacturer of children's vehicles purchased 480 tons of steel bars. Makers of these vehicles are doing a large volume of business. The demand for plates shows a slight improvement. In the structural field, little inquiry has come out, but work aggregating over 10,000 tons on which bids have been taken is pending in this city. Plans for the steel plant for the Ford Motor Co., Detroit, which have been pending for some time, have been revised and the steel requirements have been increased to 26,000 tons, based on actual estimates. It is expected that this work will be placed within a few days. Steel bars and structural material are firm at regular quotations, but more irregularity has developed in plates on which quotations of 2.40c., Pittsburgh, have appeared in outlying districts to meet Eastern and Chicago competition. Some of the Eastern plate mills are now quoting on a basis of 2.50c., Pittsburgh, for delivery in this territory. On hoops and bands 3c. is becoming more common and there are reports that this price is being shaded in spite of efforts of some makers to hold the market at 3.15c. Hot-rolled strip steel in

wide material is weak with 2.75c. a common quotation.

Jobbers quote steel bars, 3.36c.; plates and structural shapes, 3.46c.; No. 28 black sheets, 4.40c. to 4.65c.; No. 28 galvanized sheets, 5.50c. to 5.80c.; No. 10 blue annealed sheets, 3.60c. to 4.06c.; cold rolled rounds, 3.90c.; flats, squares and hexagons, 4.40c.; hoops and bands, 1 in. and wider and 20 gage or heavier, 4.16c.; narrower than 1 in. or lighter than No. 20 gage, 4.66c.; No. 9 annealed wire, \$3.50 per 100 lb.; No. 9 galvanized wire, \$3.95 per 100 lb.; common wire nails, \$3.60 base per 100 lb.

Coke.—The demand for country coke is light and is confined mostly to carlot orders. Prices are unchanged at \$5 to \$6.50 for standard Connellsville foundry coke.

Old Material.—Prices have further declined 50c. a ton on most grades and the market is weak at present levels. Turnings are particularly soft and are not bringing above \$10 delivered to Cleveland mills. Prices have now got so low that dealers are laying down considerable material. A Youngstown mill recently purchased some heavy melting steel scrap and sales of this grade to Youngstown dealers to fill this order were made during the week at \$15.50. In the southern Ohio district, heavy melting steel was sold at \$14.50. Local consumers have good stocks and are buying only small odd lots.

We quote dealers' prices f.o.b. Cleveland per gross ton:

Heavy melting steel.....	\$14.00 to \$14.25
Rails for rolling.....	16.00 to 16.25
Rails under 3 ft.....	16.00 to 16.50
Low phosphorus melting.....	16.75 to 17.25
Cast borings	10.00 to 10.25
Machine shop turnings	9.50 to 9.75
Mixed borings and short turnings	9.75 to 10.00
Compressed sheet steel.....	12.00 to 12.50
Railroad wrought.....	12.00 to 12.25
Railroad malleable	18.50 to 19.00
Light bundled sheet stampings..	9.00 to 9.25
Steel axle turnings	11.50 to 11.75
No. 1 cast.....	19.50 to 20.00
No. 1 busheling	8.75 to 9.00
Drop forge flashings	9.00 to 9.50
Railroad grate bars	15.00 to 15.50
Stove plate	15.00 to 15.50
Pipes and flues	8.00 to 9.00

St. Louis

Pig Iron Quoted \$22 Chicago and \$18.50 Birmingham, and Few Sales

ST. LOUIS, Nov. 6.—The market for pig iron continues dull and weaker. Buying has been extremely light, and sales were at concessions. Even this does not have the effect of stimulating purchasing. Melters are content to pursue the policy adopted some months ago of buying only from hand to mouth. The largest sale was of 400 tons of foundry iron to an Illinois melter by the St. Louis Coke & Iron Co., which also sold about 250 tons in carload lots during the week. This maker reduced its price to \$25 to \$26, Granite City. Quotations have been reported as low at \$22, Chicago, for Northern iron and \$18.50, Birmingham, for Southern make. The only inquiry of size before the market is from an Illinois melter for 1500 tons of foundry iron.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices \$2.16 freight from Chicago, \$3.28 from Birmingham (rail and water), \$5.17 from Birmingham, all rail, and 81 cents average switching charge from Granite City:

Northern fdy., sil. 1.75 to 2.25.....	\$24.16 to \$25.16
Northern malleable, sil. 1.75 to 2.25	24.16 to 25.16
Basic	24.16 to 25.16
Southern fdy., sil. 1.75 to 2.25	23.17 to 24.17
(rail)	23.17 to 24.17

Finished Iron and Steel.—Buying of rails by railroads centering here for 1924 delivery is believed to be ended. Both the St. Louis Southwestern and the Missouri-Kansas-Texas railroads are now taking in rails bought in 1921 and 1922 respectively on a \$40 base. The reaffirmation of present prices on sheets for the first quarter of 1924 by the United States Steel Corporation and the Inland Steel Co. is expected to strengthen the situation. The market generally continues dull.

Coke.—The demand for foundry coke is exceedingly light. Warren by-product foundry coke is quoted at \$13.50, St. Louis. Connellsville grades range from \$3.75 to \$7.50. Dealers are heavily stocked with domestic grades, and there will be no buying from that

source until there is a much heavier demand by consumers.

Old Material.—Dealers believe that heavy offerings of old material by railroads have ceased for a while at least. The Missouri Pacific's list of 6000 tons was sold to dealers here on only one day's notice and at low prices. The only other list of consequence during the week was that of the Frisco System, 600 tons. Quotations were unchanged during the week. Some inquiries were received for melting grades and although no business resulted, it had a strengthening effect on the market. There were no inquiries for rolling mill grades.

Per Gross Ton	
Iron rails	\$15.00 to \$15.50
Rolls for rolling	14.00 to 14.50
Steel rails, less than 3 ft.	15.50 to 16.00
Relaying rails 60 lb. and under ..	25.00 to 26.00
Relaying rails, 70 lb. and over ..	32.50 to 33.50
Cast iron car wheels	17.00 to 17.50
Heavy melting steel	12.00 to 12.25
Heavy shoveling steel	11.75 to 12.00
Frogs, switches and guards cut apart	13.00 to 13.50
Per Net Ton	
Heavy axles and tire turnings ..	11.00 to 11.50
Steel angle bars	12.00 to 12.25
Steel car axles	15.00 to 15.50
Iron car axles	22.50 to 23.00
Wrought iron bars and transoms ..	17.00 to 17.50
No. 1 railroad wrought	12.50 to 13.00
No. 2 railroad wrought	11.50 to 12.00
Railroad springs	14.00 to 14.50
Cast iron borings	9.00 to 9.50
No. 1 busheling	12.25 to 12.75
No. 1 railroad cast	17.00 to 17.50
No. 1 machinery cast	17.00 to 17.50
Railroad malleable	14.50 to 15.00
Machine shop turnings	9.00 to 9.50
Champion bundled sheets	7.00 to 7.50

San Francisco

Buying of Pig Iron and Finished Material Confined to Small Tonnages

SAN FRANCISCO, Oct. 31.—The trade conditions in iron and steel are very much depressed and for the present the market is without feature, with practically nothing in sight upon which to build hopes for betterment in the near future. Both the mills and foundries are sufficiently well supplied for what work they have in hand, but there is a notable scarcity of new business, and although stocks of materials on hand are at the lowest volume of the year, they show no indication of purchasing more than the smallest quantities for immediate use. Notwithstanding the dullness, importers are striving to maintain prices as steady as possible considering the downward trend so noticeable in the Eastern markets for the last few weeks. As far as the local situation is concerned, about the only business in sight, outside of the usual small trading, is the prospective award of contracts for some 16 new schoolhouses, for which the people of this city voted a \$12,000,000 bond issue last March. All of these structures are to be modern in every respect and mostly of reinforced steel and concrete construction. The plans are now approaching completion and work will doubtless begin on some of them early in the coming year. There were some inquiries in this city some ten days ago for large quantities of nails, reinforcing wire, and steel bars said to be for shipment to Japan, but as far as can be learned, they did not result in business and the inquirers have gone East, where the orders will doubtless be booked.

Pig Iron.—Business is extremely dull and buyers are very apathetic but hopeful for a turn in the trade conditions. Importers say there are few inquiries and from present indications little improvement, if any, is looked for before January. Quotable prices are less steady than two weeks ago and some lower. On the best grades \$33 is now a maximum figure, but a price range of \$32 to \$33 probably is nearer the actual selling price. There have been reports of some sales around \$30.50 to \$31, but if such sales occurred, it was doubtless due to higher silicon content. While consumers were known to be well supplied, the constant usage on small orders for the last two months or more, coupled with comparatively small replenishing, seems to convey the impression that accumulated stocks must be nearly exhausted by this time. This conclusion encourages the belief that new buying may be expected

at an early date in order to meet immediate requirements. Recent advices from Los Angeles say the demand for pig iron there is fair, with considerable business in prospect. Prices there are a little lower than in this city. Sales are reported at \$30.50 to \$31 for foreign material c.i.f. duty paid, San Pedro, within the usual silicon range of 2.75 to 3.25.

Finished Iron and Steel.—While business cannot be called active, there is some trading in progress, with prices well sustained and less disposition to shade asking figures than two or three weeks ago. The demand for steel bars continues liberal. Structural steel requirements in this part of the State are rather light for the present, but the price remains steady at \$3.85 to jobbers and \$3.535 in carload lots. The demand in Los Angeles shows steady improvement, as might be expected with the large volume of building now in progress and projected in that section.

Coke.—Practically nothing is being done in coke, the supplies on hand being small but apparently ample for all present needs. During the last three months there were small tonnage arrivals by sea and for the past two months nothing came to hand. Some little tonnage is en route, but will not arrive for about three weeks. Current quotations are about \$20 to \$21 per ton, the same as for some weeks. Domestic coke is higher.

Old Material.—Sales of old material are very moderate, with prices showing a marked downward tendency. While \$14 to \$14.50 is the full quotable figure, there are some who ask \$15, but it would have to be a high grade of heavy melting steel to bring that price. Only small quantities of cast iron scrap are moving, with \$25 to \$26 as the prevailing price. Some dealers say \$27, but it is doubtful if this could be called a quotable price. Sales are reported in Los Angeles at slightly lower figures and the trading there is said to be active, particularly for the more desirable grades.

Boston

Eastern Pennsylvania and Buffalo Furnaces Divide New England Business

BOSTON, Nov. 6.—A Massachusetts stove maker purchased 1000 tons No. 2X pig iron, two other melters 500 tons each of similar iron and several 200 and 100-ton as well as car lots run the aggregate sales for the past week well up into four figures. Business was about evenly divided between Buffalo and eastern Pennsylvania furnaces. Buffalo interests openly quote \$22, furnace, on No. 2 plain and No. 2X, but \$21.50 has been accepted. Eastern Pennsylvania No. 2X sold at \$23, furnace, but is freely offered at \$22.50 and at least one large tonnage was taken at less than \$22.50 for No. 2X. Furnaces in that territory also are waiving differentials. Most iron sold is specified as fourth quarter, but deliveries on some of it will extend into January. A car of high silicon Lake charcoal sold on terms better than \$27, furnace base.

We quote delivered prices on the basis of the latest reported sales as follows, having added \$3.65 freight from eastern Pennsylvania, \$4.91 from Buffalo, \$5.92 from Virginia, and \$9.60 from Alabama:

East. Penn., sil. 2.25 to 2.75	\$26.15 to \$27.15
East. Penn., sil. 1.75 to 2.25	25.65 to 26.65
Buffalo, sil. 2.25 to 2.75	26.41 to 27.41
Buffalo, sil. 1.75 to 2.25	26.41 to 26.91
Virginia, sil. 2.25 to 2.75	30.42 to 31.42
Virginia, sil. 1.75 to 2.25	29.92 to 30.42
Alabama, sil. 2.25 to 2.75	29.60 to 31.10
Alabama, sil. 1.75 to 2.25	29.10 to 30.60

Warehouse Business.—Warehouse prices on cold-rolled steel have been reduced 40c. per 100 lb. to \$4.35 on rounds and \$4.85 on other shapes. Otherwise lists remain as heretofore. The movement of iron and steel out of stock is moderately active. Most warehouses are well stocked although last quarter purchases from mills were light. Warehouse prices follow:

Soft steel bars, \$3.51½ at 100 lb. base; flats, \$4.40; regular concrete bars, \$3.76½; deformed bars, stock lengths, \$3.76½ to \$3.89; structural steel, \$3.61½; tire steel, \$4.80 to \$5.15; open-hearth spring steel, \$6.50 to \$10; crucible spring steel, \$12; regular steel bands, \$4.31½; bands over 6 in. wide, \$5.05 to \$5.30; hoop steel, \$5.80 to \$6.20; cold rolled steel, \$4.25 to \$4.85; refined iron, \$3.51½; best refined, \$4.75; Wayne iron, \$5.50; Norway iron, \$6.60 to \$7.10.

Coke.—It is estimated 85 per cent of the New England foundries have contracted with the New England Coal & Coke Co. and the Providence Gas Co. for first half of 1924 by-product foundry coke requirements. Some melters contracted for less than they did a year ago, but collectively there is little variation in the tonnage. Both New England companies quote \$12.50 delivered on November specifications.

Old Material.—With dealers still lacking orders and owners of scrap more anxious to sell, prices continue to weaken under their own weight. Transactions the past week centered largely in borings and turnings. Car lots of machine shop turnings and cast iron borings for rolling mills were taken at \$7 to \$7.50 shipping point, mixed borings and turnings at \$6.75 to \$7.25, and chemical borings at \$9 to \$9.50 for the best and \$8.50 to \$8.75 for less desirable material. Machinery cast is 50c. a ton lower due to a contraction in buying by New England foundries. The market for heavy melting steel is lifeless. Dealers, who last month offered \$10 to \$10.50 shipping point for such material, say they cannot do better than \$9 to \$9.50 today and that there is no demand at any price.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast.....	\$22.00 to \$22.50
No. 2 machinery cast.....	20.00 to 20.50
Stove plate	16.00 to 16.50
Railroad malleable	20.00 to 21.00

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel.....	\$9.50 to \$10.00
No. 1 railroad wrought.....	12.00 to 13.00
No. 1 yard wrought.....	10.50 to 11.00
Wrought pipe (1-in. in diam., over 2 ft. long).....	9.00 to 9.50
Machine shop turnings.....	7.00 to 7.50
Cast iron borings, rolling mill...	7.00 to 7.50
Cast iron borings, chemical.....	8.50 to 9.50
Blast furnace borings and turnings	6.75 to 7.25
Forged scrap and bundled skeleton	6.50 to 7.00
Street car axles.....	12.50 to 13.00
Street car wheels.....	11.00 to 12.50
Rails for rerolling.....	11.00 to 12.50

Philadelphia

Extreme Quiet Prevails in All Branches of Iron and Steel Market

PHILADELPHIA, Nov. 5.—Resigned to the belief that present quiet conditions may continue through the remainder of the year, the iron and steel trade is giving more attention to possible developments that may have a bearing on first quarter demand. Chief among the prospects promising renewed buying activity is the railroad program. This may be forecasted at the banquet in New York Thursday evening of the American Railway Association. The car-buying program, of which there has been much talk in recent weeks, has materialized only in a small way. An inquiry of the week is from the Chesapeake & Ohio for 2000 gondolas. Expectations of a large volume of locomotive buying are given fresh impetus through inquiries now in the market, some of which are in such intangible form that the roads are not mentioned by name, but the aggregate is more than 200 locomotives in addition to an equal number reported a few weeks ago. The Union Pacific has inquired for 60 and three other roads account for a total of 150. There is talk of the purchase of 500 by the Pennsylvania Lines, but this is very indefinite. It is upon such prospects that the steel trade is building hopes of renewed buying of steel.

In pig iron there have been no significant developments since the sale, reported last week, of 2500 tons of foundry grades at \$21, furnace, the record low price of the year. Small sales are being made at nearer \$23, furnace. Scrap prices show a little more resistance and declines this week are few.

Pig Iron.—Surprisingly little pressure has been exerted by pig iron consumers to obtain quotations on foundry iron as low as \$21, furnace, made a week ago by a New Jersey furnace on a 2500-ton sale. In fact, there has been no inquiry of sufficient interest to tempt other producers to go that low. Sales have been confined mostly to carload lots, a few sales of 200 or 300 tons being exceptional for this district, although there

has been demand of a slightly more important character from New England. The price situation remains much the same as a week ago, furnaces quoting around \$23, furnace, on No. 2 plain and No. 2 X on small lots and reserving lower prices for such tonnage as may seem worthy of special consideration. Thirty-two hundred tons of low phosphorus iron from England was unloaded here last week.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia and include freight rates varying from 76 cents to \$1.63 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	\$22.64 to \$24.13
East. Pa. No. 2X, 2.25 to 2.75 sil.	22.64 to 24.63
East. Pa. No. 1X.....	23.76 to 25.13
Virginia No. 2 plain, 1.75 to 2.25 sil.	29.17 to 30.17
Virginia No. 2X, 2.25 to 2.75 sil.	30.17 to 30.67
Basic delivered eastern Pa.	23.00 to 24.00
Gray forge	23.00 to 24.00
Malleable	23.00 to 24.00
Standard low phos. (f.o.b. furnace)	28.00 to 30.00
Copper bearing low phos. (f.o.b. furnace)	28.00

Ferroalloys.—Both domestic producers and British agents are quoting \$110, furnace or seaboard, on ferromanganese. Sales are few and unimportant.

Semi-Finished Steel.—No real test of billet prices is being made, and quotations remain at \$40, Pittsburgh, for open-hearth rerolling quality and \$45 for forging quality.

Plates.—A large producer of plates reports that sales in October exceeded those of September by 10 per cent and a gradually improving demand over the remainder of the year is looked for, based largely on the fact that many consumers are fast using up their stocks and will need some replenishment. The Newport News Shipbuilding & Dry Dock Co., which was awarded the contract for building two steamships for the Old Dominion Line, has let the steel, about 3600 tons of plates and 1200 tons of shapes, to the Carnegie Steel Co. The latter company will also furnish steel for five barges which the Sun Shipbuilding Co. will build for the Standard Oil Co., and this latter order may be increased either to 15 or 24, each barge requiring a few hundred tons of steel. The Union Pacific Railroad is in the market for 60 locomotives. Prices quoted range from 2.40c. to 2.50c., Pittsburgh, according to the mill and tonnage desired. Plates for export have been quoted as low as 1.98c., Pittsburgh.

Structural Material.—Current inquiries are made up of small lots, mostly of carload size, there being an absence of building projects of size. The general contract for the new Ford Motor Co. plant to be built in Philadelphia has not been let. The contract for this work will be let at Detroit. Prices on plain material range from 2.40c. to 2.50c., Pittsburgh, two Eastern mills naming the lower price. For export a price which is equivalent to 1.98c., Pittsburgh, was quoted.

Warehouse Business.—Orders for steel out of stock are estimated by one large warehouse at about 60 per cent of what is considered a normal volume. Prices for local delivery are as follows:

Soft steel bars and small shapes, 3.47c.; iron bars (except bands), 3.47c.; round edge iron, 3.75c.; round edge steel, iron finished, 1½ x ½ in., 3.75c.; round edge steel planished, 4.55c.; tank steel plates, ¼ in. and heavier, 3.57c.; tank steel plates, ½ in., 3.82c.; blue annealed steel sheets, No. 10 gage, 4.10c.; black sheets, No. 28 gage, 5.15c.; galvanized sheets, No. 28 gage, 6.25c.; square twisted and deformed steel bars, 3.57c.; structural shapes, 3.57c.; diamond pattern plates, ¼-in., 5.40c.; ½-in., 5.60c.; spring steel, 5c.; round cold-rolled steel, 4.35c.; squares and hexagons, cold-rolled steel, 4.85c.; steel hoops, 1 in. and wider, No. 20 gage and heavier, 4.27c.; narrower than 1 in., all gages, 4.77c.; steel bands, No. 12 gage to ½-in., inclusive, 4.27c.; rails, 3.47c.; tool steel, 8.50c.; Norway iron, 7c.

Bars.—Demand for steel bars is confined to small lots. Mill prices are firm at 2.40c., Pittsburgh, on bars rolled from new steel, but on rerolled bars quotations are slightly lower. Steel bars for export have been quoted at a price equivalent to 2.08c., Pittsburgh. Bar iron remains at 2.35c., Pittsburgh.

Sheets.—The announcement of the American Sheet & Tin Plate Co. that present prices on sheets will be continued for first quarter contracting has created more confidence among independent sheet producers. While one or two mills are still quoting 3.75c. on black and

4.90c. on galvanized, most of the mills are adhering strictly to 3.85c. on black, 5c. on galvanized and 3c. on blue annealed.

Ore.—Ore imports last week were 12,553 tons of iron ore from Sweden and 8330 tons of manganese ore from Africa.

Old Material.—Prices for scrap begin to show a little resistance to the pressure which has been bearing them downward for the past few months. Large dealers are becoming satisfied that scrap is a good purchase at present levels and are accumulating stocks. Consumers are showing very little interest. The Steel Scrap Co. of Philadelphia, organized and owned by the Perry, Buxton, Doane Co. and Luria Brothers & Co., scrap brokers and dealers, was successful bidders for two uncompleted battleships at Philadelphia and two at Brooklyn. The warship under construction at Norfolk, Va., was awarded to N. Block & Co., that city.

We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel.....	\$15.00
Scrap rails.....	15.00
Steel rails for rolling.....	\$17.00 to 17.50
No. 1 low phos., heavy 0.04 and under.....	20.00 to 21.00
Couplers and knuckles.....	17.50 to 18.50
Cast-iron car wheels.....	17.50 to 18.50
Rolled steel wheels.....	17.50 to 18.00
No. 1 railroad wrought.....	17.00 to 17.50
No. 1 yard wrought.....	15.50 to 16.00
No. 1 forge fire.....	11.00 to 11.50
Bundled sheets (for steel works)	11.00 to 11.50
Mixed borings and turnings (for blast furnace use).....	10.50 to 11.00
Machine shop turnings (for steel works use).....	11.00 to 11.50
Machine shop turnings (for rolling mill use).....	11.50 to 12.00
Heavy axle turnings (or equivalent).....	12.00 to 13.00
Cast borings (for steel works and rolling mills).....	11.50 to 12.00
Cast borings (for chemical plants).....	15.00 to 16.00
No. 1 cast.....	19.00 to 19.50
Heavy breakable cast (for steel plants).....	16.00 to 16.50
Railroad grate bars.....	16.00 to 16.50
Stove plate (for steel plant use).....	16.00 to 16.50
Railroad malleable.....	17.00 to 17.50
Wrought iron and soft steel pipes and tubes (new specifications).....	14.00 to 14.50
Shafting.....	20.00 to 21.00
Steel axles.....	18.50 to 19.50

Cincinnati

More Interest in Pig Iron—Inquiries Mostly for Early Shipment

CINCINNATI, Nov. 5.—There are indications of impendence of activity in the pig iron market. Sales are not heavy, but there is more inquiry from widely scattered sources. Most of the inquiries are for November and December shipment, though a few are for first quarter and first half. Sentiment in the trade is undoubtedly better and there are some who believe a buying movement is in the making. Prices are unchanged from last week, though in the case of Southern irons nearly all the producers have named \$21, base, as the price at which they will book first quarter business. The market for the rest of this year continues at \$19.50, however, and one furnace has booked small orders for first quarter at this price. In the North, the market is still \$23, Iron-ton, though reports are current of this price being shaded in competition with lake front furnaces, which last week were quoting \$22 in competitive territory. There is little activity in basic, Bessemer or silvery irons and prices are unchanged. Inquiries include 2200 tons of foundry from West Virginia, 500 tons of malleable from Indiana and two lots of 500 tons of Southern for radiator plants in southern Illinois. Some inquiries for Southern iron are also reported from Michigan, but as the delivered price of Northern iron is so much lower, it is not expected that any business will accrue from this source. Hanging Rock furnace went out last week, and Marting furnace is expected to go out.

Based on freight rates of \$4.05 from Birmingham and \$2.27 from Iron-ton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)....	\$23.55
Southern coke, sil. 2.25 to 2.75 (No. 2 soft).....	24.05
Ohio silvery, 8 per cent.....	34.77
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2).....	25.27
Basic Northern.....	25.27
Malleable.....	25.27

Sheets.—The American Sheet & Tin Plate Co. has opened its books for first quarter at the prices named for last quarter of this year. It is likely independent companies will follow the lead, and some of them have already done so. On current business, however, prices of black and galvanized sheets are being shaded by \$2 to \$3 per ton. Tin plate is in good demand.

Structural Materials.—There is a fair demand for structural shapes in small tonnages, but no large projects have come out during the past week. The Big Four Railroad awarded 535 tons of bridge work. A number of projects, long in contemplation, are expected to develop within the next three weeks, however, and considerable tonnages of steel will be required.

Reinforcing Bars.—The city of Louisville is taking bids on a sewage disposal plant requiring 120 tons of bars. This is the largest inquiry actually reported. An inquiry from Dayton for approximately 500 tons for a bank building is doubtful, the plans for the building having been withdrawn temporarily. Prices of reinforcing bars are unchanged from last week, the range being from 2.25c. for rerolled bars, to 2.40c. for bars rolled from new billets.

Warehouse Business.—Jobbers report business rather quiet during the past week or two, though no price changes have been made.

Cincinnati jobbers quote: Iron and steel bars, 3.50c.; reinforcing bars, 3.60c.; hoops, 4.55c.; bands, 4.25c.; shapes, 3.60c.; plates, 3.60c.; cold-rolled rounds, 4.50c.; cold rolled flats, squares and hexagons, 5c.; No. 10 blue annealed sheets, 4.10c.; No. 28 black sheets, 4.80c.; No. 28 galvanized sheets, 5.85c.; No. 9 annealed wire, \$3.60 per 100 lbs.; common wire nails, \$3.60 per keg base; cement coated nails, \$3.30 per keg.

Finished Materials.—Each succeeding week sees a slight improvement in the demand for finished materials, but orders are being placed for only small tonnages for immediate delivery. There has been an increased demand for steel bars and plates, and one inquiry for 1000 tons of tank plates is current for immediate delivery. Prices of bars are being maintained at 2.40c. and plates at 2.50c. On cold-finished bars, however, the top of the market is not more than 3.15c., with 3c. being the more common quotation. Wire products are in only fair demand. Some small orders for light rails have been placed from coal mining districts. Hoops and bands are showing more activity, and prices are firmer. Track accessories are in demand from only a number of the smaller roads, but an inquiry is expected for a large tonnage of spikes, angle bars and tie plates from the Big Four Railroad. Bolts and nuts are moving slowly, with prices weak.

Coke.—Coke demand is light, particularly in furnace and foundry grades. Domestic inquiries, however, are more numerous. Prices generally are unchanged from last week, Connellsville furnace being quoted at \$3.75 to \$4, foundry at \$5 to \$6. New River foundry is quoted at \$10 to \$11, and Wise County furnace, \$5.25 to \$6, and foundry \$6 to \$7.

Old Material.—A steel company in this district is reported to have purchased 2000 tons of heavy melting steel at \$14.50, delivered. While the market is not active, some dealers report more interest on the part of consumers, and small sales are being made. There is a tendency on the part of dealers to hold the market at present levels, but with large tonnage being thrown on the market through Government sales and railroad offerings, this is likely to prove something of a job, in the opinion of consumers. Prices generally, while nominal, are fairly steady at last week's levels.

We quote dealers' buying prices, f.o.b. cars Cincinnati:

	Per Gross Ton
Bundled sheets.....	\$9.50 to \$10.00
Iron rails.....	13.00 to 13.50
Relaying rails, 50 lb. and up....	27.00 to 27.50
Rails for rolling.....	13.00 to 13.50
Heavy melting steel.....	12.00 to 12.50
Steel rails for melting.....	12.50 to 13.00
Car wheels.....	12.50 to 13.00

	Per Net Ton
No. 1 railroad wrought.....	11.00 to 11.50
Cast borings.....	7.50 to 8.00
Steel turnings.....	7.00 to 7.50
Railroad cast.....	13.50 to 14.00
No. 1 machinery cast.....	16.50 to 17.00
Burnt scrap.....	10.50 to 11.00
Iron axles.....	20.50 to 21.00
Locomotive tires (smooth inside).....	12.50 to 13.00
Pipes and flues.....	6.50 to 8.00

Prices Finished Iron and Steel f.o.b. Pittsburgh

Carload Lots

Plates

Sheared, tank quality, base, per lb.....2.50c.

Structural Materials

Beams, channels, etc., base, per lb.....2.50c.

Sheet piling2.65c.

Iron and Steel Bars

Soft steel bars, base, per lb.....2.40c.

Soft steel bars for cold finishing.....\$3 per ton over base

Reinforcing steel bars, base.....2.40c.

Refined iron bars, base, per lb.....3.10c. to 3.15c.

Double refined iron bars, base, per lb.....4.75c.

Stay bolt iron bars, base, per lb.....7.75c. to 8c.

Hot-Rolled Flats

Hoops, base, per lb.....3.15c.

Bands, base, per lb.....3c. to 3.15c.

Strips, base, per lb.....3c. to 3.15c.

Cotton ties, per bundle of 45 lb.....\$1.63

Cold-Finished Steels

Bars and shafting, base, per lb.....3c.

Bars, S. A. E. Series, No. 2100.....4.25c. to 4.50c.

Bars, S. A. E. Series, No. 2300.....6.25c. to 6.50c.

Bars, S. A. E. Series, No. 3100.....5.75c. to 5.50c.

Strips, base, per lb.....5.00c.

Wire Products

Nails, base, per keg.....\$3.00

Galvanized nails, 1 in. and over.....\$2.25 over base

Galvanized nails, less than 1 in.....2.50 over base

Bright plain wire, base, No. 9 gage, per 100 lb.....\$2.75

Annealed fence wire, base, per 100 lb.....2.90

Spring wire, base, per 100 lb.....3.70

Galvanized wire, No. 9, base, per 100 lb.....3.35

Galvanized barbed, base, per 100 lb.....3.80

Galvanized staples, base, per keg.....3.80

Painted barbed wire, base, per 100 lb.....3.45

Polished staples, base, per keg.....3.45

Cement coated nails, base, per count keg.....2.70

Woven fence, carloads (to jobbers).....67½ per cent off list

Woven fence, carloads (to retailers).....65 per cent off list

Bolts and Nuts

Machine bolts, small, rolled threads.....60, 10 and 10 per cent off list

Machine bolts, all sizes, cut threads.....60 and 10 per cent off list

Carriage bolts, ½ x 6 in.:
Smaller and shorter, rolled threads.....60 and 10 per cent off list

Carriage bolts, cut threads, all sizes.....60 per cent off list

Lag bolts65 and 10 per cent off list

Plow bolts, Nos. 1, 2 and 3 heads.....50 and 10 per cent off list

Other style heads.....50 per cent extra

Machine bolts, c.p.c. and t. nuts, ½ x 4 in.....50 and 10 per cent off list

Larger and longer sizes.....50 and 10 per cent off list

Hot pressed square or hex. nuts, blank.....4.25c. off list

Hot pressed nuts, tapped.....4.25c. off list

C.p.c. and t. square or hex. nuts, blank.....4.00c. off list

C.p.c. and t. square or hex. nuts, tapped.....4.00c. off list

Small finished hex. nuts:
½ in. and smaller, U. S. S.....80 and 5 per cent off list

¾ in. and larger, U. S. S.....75 and 5 per cent off list

Small sizes, S. A. E.....80, 10 and 5 per cent off list

S. A. E., ½ in. and larger.....75, 10 and 5 per cent off list

Stove bolts in packages.....75, 10 and 5 per cent off list

Stove bolts in bulk.....75, 10, 5 and 2½ per cent off list

Tire bolts60 and 10 per cent off list

Bolt ends with hot pressed nuts.....60 and 5 per cent off list

Turnbuckles, with ends, ½ in. and smaller,
55 and 5 to 50 per cent off list

Turnbuckles, without ends, ½ in. and smaller,
70 and 10 to 65 and 5 per cent off list

Washers70 and 10 to 65 and 5 per cent off list

Cap and Set Screws

Milled square and hex. head cap screws.....70 per cent off list

Milled set screws.....70 per cent off list

Upset cap screws.....75 and 10 per cent off list

Upset set screws.....75 and 10 per cent off list

Milled studs50 and 10 per cent off list

Rivets

Large structural and ship rivets, base, per 100 lb.....\$2.75 to \$2.85

Small rivets65 and 10 to 70 off list

Track Equipment

Spikes, ½ in. and larger, base, per 100 lb.....\$3.15

Spikes, ½ in., ⅞ in. and ¾ in., per 100 lb.....\$3.15 to 3.50

Spikes, ¾ in. and larger, base, per 100 lb.....3.15 to 3.50

Spikes, boat and barge, base, per 100 lb.....3.50

Track bolts, ¾ in. and larger, base, per 100 lb.....4.00 to 4.25

Track bolts, ½ in. and ¾ in., base, per 100 lb.....5.00 to 5.50

Tie plates, per 100 lb.....2.55 to 2.60

Angle bars, base, per 100 lb.....2.75

Freight Rates

All freight rates from Pittsburgh on finished iron and steel products, carload lots, per 100 lb.:

Philadelphia, domestic.....\$0.32	Buffalo.....\$0.265
Philadelphia, export.....0.235	Cleveland.....0.215
Baltimore, domestic.....0.31	Cleveland, Youngstown.....0.19
Baltimore, export.....0.225	Comb.....0.19
New York, domestic.....0.34	Detroit.....0.29
New York, export.....0.255	Cincinnati.....0.29
Boston, domestic.....0.365	Indianapolis.....0.31
Boston, export.....0.255	Chicago.....0.34

The minimum carload to most of the foregoing points is 6000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 35c.; ship plates, 40c.; ingot and muck bars, structural steel, common wire products including cut or wire nails, spikes, and wire hoops, 40c.; sheets and tin plates, 40c.; sheets, No. 12 gage and lighter, 50c.; rods, 40c.; wire rope cables and strands, 45c.; wire fencing, netting and stretcher, 40c.; pipes, not over 12 in. in diameter, 55c.; over 12 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

Welded Pipe

Butt Weld

Inches	Steel Black	Galv.	Inches	Iron Black	Galv.
1½	45	19½	1½ to 3	+11	+39
1½ to 3	51	25½	3	22	2
1½	56	42½	3	28	11
1½	60	48½	1 to 1½	30	13
1 to 3	62	50½			

Lap Weld

2	55	43½	2	23	7
2½ to 6	59	47½	2½	26	11
7 and 8	56	43½	3 to 6	28	13
9 and 10	54	41½	7 to 12	26	11
11 and 12	53	40½			

Butt Weld, extra strong, plain ends

1½	41	24½	2 to 3	61	50½
1½ to 3	47	30½	1½ to 3	+19	+54
1½	53	42½	3	21	7
1½	58	47½	3	28	12
1 to 1½	60	49½	1 to 1½	30	14

Lap Weld, extra strong, plain ends

2	53	42	2	23	9
2½ to 4	57	46½	2½ to 4	29	15
4½ to 6	56	45½	4½ to 6	28	14
7 to 8	52	39½	7 to 8	21	7
9 and 10	45	32½	9 to 12	16	2
11 and 12	44	31½			

To the large jobbing trade the above discounts are increased by one point, with supplementary discounts of 5 per cent on black and 1½ points, with a supplementary discount of 5 per cent on galvanized.

Boiler Tubes

Lap Welded Steel	Charcoal Iron
2 to 2½ in.....27	1½ in.....+18
2½ to 2¾ in.....37	1¾ to 1½ in.....+8
3 in.....40	2 to 2½ in.....2
3½ to 3¾ in.....42½	2½ to 3 in.....7
4 to 13 in.....46	3¼ to 4½ in.....9

Less carload lots 4 points less.

Standard Commercial Seamless Boiler Tubes

Cold Drawn	Hot Rolled
1 in.....55	3 and 3½ in.....36
1½ and 1½ in.....47	3½ and 3½ in.....37
1¾ in.....31	4 in.....41
2 and 2½ in.....22	4½ in. and 5 in.....33
2½ and 2¾ in.....32	
3 and 3½ in.....38	4 in.....43
3½ in. and 3¾ in.....39	

Less carloads, 4 points less. Add \$8 per net ton for more than four gages heavier than standard. No extras for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be sold at mechanical tube list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Carbon under 0.30, base.....83 per cent off list

Carbon 0.30 to 0.40, base.....81 per cent off list

Plus usual differentials and extras for cutting. Warehouse discounts range higher.

Seamless Locomotive and Superheater Tubes

Cents per Ft.	Cents per Ft.
2-in. O.D. 12 gage.....15	2½-in. O.D. 10 gage.....20
2-in. O.D. 11 gage.....16	3-in. O.D. 7 gage.....35
2-in. O.D. 10 gage.....17	1½-in. O.D. 9 gage.....15
2½-in. O.D. 12 gage.....17	5½-in. O.D. 9 gage.....55
2½-in. O.D. 11 gage.....18	5½-in. O.D. 9 gage.....57

Tin Plate

Standard cokes, per base box.....\$5.50

Terne Plate

(Per Package, 20 x 28 in.)	
8-lb. coating, 100 lb.....\$11.00	20-lb. coating I. C.....\$14.90
base.....11.00	25-lb. coating I. C.....16.20
8-lb. coating I. C.....11.30	30-lb. coating I. C.....17.35
12-lb. coating I. C.....12.70	35-lb. coating I. C.....18.35
15-lb. coating I. C.....13.95	40-lb. coating I. C.....19.35

Sheets

Blue Annealed

Nos. 9 and 10 (base), per lb.....3.00c.

Box Annealed, One Pass Cold Rolled

No. 28 (base), per lb.....3.75c. to 3.85c.

Automobile Sheets

Regular auto body sheets, base (22 gage), per lb.....5.35c.

Galvanized

No. 28 (base), per lb.....4.90c. to 5c.

Long Ternes

No. 28 gage (base), 8-lb. coating, per lb.....5.30c.

Tin-Mill Black Plate

No. 28 (base), per lb.....3.85c.

Prices of Raw Materials, Semi-Finished and Finished Products

Ores

Lake Superior Ores, Delivered Lower Lake Ports

Old range Bessemer, 55 per cent iron.....	\$6.45
Old range non-Bessemer, 51½ per cent iron.....	5.70
Mesabi Bessemer, 55 per cent iron.....	6.20
Mesabi non-Bessemer, 51½ per cent iron.....	5.55

Foreign Ore, per Unit, c.i.f. Philadelphia or Baltimore

Iron ore, low phos., copper free, 55 to 58 per cent iron in dry Spanish or Algerian..	10.50c.
Iron ore, Swedish, average 66 per cent iron	10.50c.
Manganese ore washed, 51 per cent manganese, from the Caucasus, nominal....	42c.
Manganese ore, ordinary, 48 per cent manganese, from the Caucasus.....	39c.
Manganese ore, Brazilian or Indian, nominal	42c.
Tungsten ore, per unit, in 60 per cent concentrates	\$8.25 to \$10.00
Chrome ore, basic, 48 per cent Cr ₂ O ₃ , crude, per ton, c.i.f. Atlantic seaboard.....	18.00 to 28.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS ₃ , New York.....	75c. to 85c.

Ferroalloys

Ferromanganese, domestic, 80 per cent, furnace, or seaboard, per ton.....	\$110.00
Ferromanganese, British, 80 per cent, f.o.b. Atlantic port, duty paid.....	110.00
Spiegeleisen, domestic, 19 to 21 per cent, per ton, furnace	\$42.00 to 45.00
Spiegeleisen, domestic, 16 to 19 per cent, furnace, per ton	41.00 to 44.00
Ferrosilicon, 50 per cent, delivered, per gross ton	82.50 to 85.00
Ferrosilicon, Bessemer, 10 per cent, per ton, furnace	43.50
Ferrosilicon, Bessemer, 11 per cent, per ton, furnace	46.80
Ferrosilicon, Bessemer, 12 per cent, per ton, furnace	50.10
Ferrosilicon, Bessemer, 13 per cent, per ton, furnace	54.10
Ferrosilicon, Bessemer, 14 per cent, per ton, furnace	59.10
Silvery iron, 6 per cent, per ton, furnace..	30.00
Silvery iron, 7 per cent, per ton, furnace..	31.00
Silvery iron, 8 per cent, per ton, furnace..	32.50
Silvery iron, 9 per cent, per ton, furnace..	34.50
Silvery iron, 10 per cent, per ton, furnace..	36.50
Silvery iron, 11 per cent, per ton, furnace..	39.80
Silvery iron, 12 per cent, per ton, furnace..	43.10
Ferrotungsten, per lb. contained metal....	88c. to 90c.
Ferrochromium, 4 to 6 per cent carbon, 60 to 70 per cent Cr. per lb. contained Cr. delivered	12c.
Ferrochromium, 6 to 7 per cent carbon, 60 to 70 per cent Cr., per lb.	11.50c.
Ferrovanadium, per lb. contained vanadium	\$3.50 to \$4.00
Ferrocobaltitium, 15 to 18 per cent, per net ton	200.00

Fluxes and Refractories

Fluorspar, 80 per cent and over calcium fluoride, not over 5 per cent silica, per net ton f.o.b. Illinois and Kentucky mines	\$22.00
Fluorspar, 85 per cent and over calcium fluoride, not over 5 per cent silica, per net ton f.o.b. Illinois and Kentucky mines	23.50
Per 1000 f.o.b. works:	
Fire Clay:	
High Duty	
Moderate Duty	
Pennsylvania	\$42.00 to \$45.00
Maryland	47.00
Ohio	42.00 to 43.00
Kentucky	42.00 to 43.00
Illinois	37.00 to 42.00
Missouri	42.00 to 45.00
Ground fire clay, per net ton.....	6.00 to 7.00
Silica Brick:	
Pennsylvania	42.00
Chicago	49.00
Birmingham	50.00
Ground silica clay, per net ton.....	8.00
Magnesite Brick:	
Standard size, per net ton (f.o.b. Baltimore and Chester, Pa.)	65.00
Grain magnesite, per net ton (f.o.b. Baltimore and Chester, Pa.)	40.00
Chrome Brick:	
Standard size, per net ton	50.00

Semi-Finished Steel, f.o.b. Pittsburgh or Youngstown, per gross ton

Rolling billets, 4-in. and over.....	\$40.00
Rolling billets, 2-in. and under.....	40.00
Forging billets, ordinary carbons.....	45.00
Sheet bars, Bessemer.....	42.50
Sheet bars, open-hearth.....	42.50

Slabs	\$40.00
Wire rods, common soft, base, No. 5 to ¼-in.....	51.00
Wire rods, common soft, coarser than ¼-in.	\$2.50 over base
Wire rods, screw stock.....	\$5.00 per ton over base
Wire rods, carbon 0.20 to 0.40.....	3.00 per ton over base
Wire rods, carbon 0.41 to 0.55.....	5.00 per ton over base
Wire rods, carbon 0.56 to 0.75.....	7.50 per ton over base
Wire rods, carbon over 0.75.....	10.00 per ton over base
Wire rods, acid	15.00 per ton over base
Skelp, grooved, per lb.	2.40
Skelp, sheared, per lb.	2.40
Skelp, universal, per lb.	2.40

Finished Iron and Steel, f.o.b. Mill

Rails, heavy, per gross ton	\$43.00
Rails, light, new steel, base, lb.....	2.15c. to 2.25c.
Rails, light, rerolled, base, per lb.....	1.85c. to 2.00c.
Rails, ½-in. and larger, base, per 100 lb..	\$3.15
Spikes, ½-in., ⅞-in. and ¾-in., base per 100 lb.	\$3.15 to 3.50
Spikes, ½-in., base, per 100 lb.	3.15 to 3.50
Spikes, boat and barge, base, per 100 lb....	3.50
Track bolts, ⅝-in. and smaller, base, per 100 lb.	4.00 to 4.25
Track bolts, ¾-in. and larger, base, per 100 lb	4.75 to 5.50
Tie plates, per 100 lb.	2.55 to 2.60
Angle bars, per 100 lb.	2.75
Bars, common iron, base, per lb., Chicago mill	2.40c.
Bars, common iron, Pittsburgh mill	2.40c.
Bars, rails, steel reinforcing, base, per lb....	2.15c. to 2.25c.
Ground shafting, base, per lb.	3.65c.
Cut nails, base, per keg.....	\$3.15 to \$3.25

S. A. E. Semi-finished Castelled Nuts and U. S. S. Semi-finished Slotted Nuts

(To jobbers and consumers in large quantities f.o.b. Pittsburgh.)

	Per 1000	S. A. E.	U. S. S.
¼-in.	\$ 4.80	\$ 4.80	
½-in.	5.50	6.00	
¾-in.	6.50	7.00	
1-in.	9.00	9.50	
1½-in.	11.00	11.50	
2-in.	15.00	15.00	
2½-in.	19.50	20.00	
3-in.	28.50	28.50	
3½-in.	37.00	37.50	
4-in.	58.50	60.50	
1¼-in.	85.00	97.00	
1½-in.	132.00	132.00	
1¾-in.	176.00	176.00	
2-in.	220.00	220.00	

Larger sizes—Prices on application.

Alloy Steel

S.A.E. Series Numbers	Bars 100 lb.
2100* (½% Nickel, 10 to 20 per cent Carbon)...	\$3.25 to \$3.50
2300 (3½% Nickel)	5.00 to 5.25
2500 (5% Nickel)	7.75 to 8.00
3100 (Nickel Chromium)	4.00 to 4.25
3200 (Nickel Chromium)	5.75 to 6.00
3300 (Nickel Chromium)	8.00 to 8.25
3400 (Nickel Chromium)	7.00 to 7.25
5100 (Chromium Steel)	3.50 to 3.75
5200* (Chromium Steel)	8.00 to 8.25
6100 (Chromium Vanadium bars)	4.75 to 5.00
6100 (Chromium Vanadium spring steel).....	4.50 to 4.75
9250 (Silico Manganese spring steel).....	3.75 to 4.00
Nickel Chrome Vanadium (0.60 Nickel, 0.50 Chromium, 0.15 Vanadium)	5.00 to 5.25
Chromium Molybdenum bars (0.80—1.10 Chromium, 0.25—0.40 Molybdenum).....	4.50 to 4.75
Chromium Molybdenum bars (0.50—0.70 Chromium, 0.15—0.25 Molybdenum)	4.25 to 4.50
Chromium Molybdenum spring steel (1—1.25 Chromium, 0.30—0.50 Molybdenum)	4.25 to 4.50

Above prices are for hot-rolled alloy steel bars, forging quality, per 100 lb., f.o.b. Pittsburgh. Billets 4 x 4 in. and larger are \$10 per gross ton less than net ton price for bars of same analyses. On smaller than 4 x 4-in. billets down to and including 2½-in. sq. there is a size extra of \$10 per gross ton; on billets smaller than 2½-in. sq. the net ton bar price applies.

*Not S.A.E. specifications, but numbered by manufacturers to conform to S.A.E. system.

FABRICATED STEEL BUSINESS

Two New York Buildings to Require 23,000 Tons

Of 39,500 tons of structural steel being inquired for, 23,000 tons are involved in two buildings for New York City, one of them for the American Telephone & Telegraph Co. requiring 18,000 tons. Awards for the week total more than 19,000 tons, of which 4400 tons were taken for a subway extension in Queens Borough, New York. Much of the work closed and in prospect is accounted for by the continued building activity in New York, unusual for this time of year.

School No. 205, Brooklyn, 1550 tons, to Hay Foundry & Iron Works.

American Insurance Co. building, Newark, N. J., 300 tons, to Hay Foundry & Iron Works.

Parental School, Flushing, 600 tons, to Harris Structural Steel Co.

Apartment house, 1133 Park Avenue, New York, 500 tons, to Paterson Bridge Co.

School No. 99, Kew Gardens, 350 tons, to George A. Just Co.

Apartment house, 2789 Broadway, 1000 tons, to Paterson Bridge Co.

Loft Building, West Thirty-eighth Street, 1000 tons, to Levgar Structural Co.

Baltimore & Ohio, three bridges, 1250 tons, to the American Bridge Co.

Norfolk & Western, two bridges, 300 tons, to the American Bridge Co.

Power house, Weymouth, Mass., 400 tons, to the Shoemaker, Satterthwait Bridge Co.

Bigelow Hartford Carpet Co., Thompsonville, Conn., 300 tons, to the American Bridge Co.

Atlantic Coast Line, shop at South Rocky Mountain, N. C., 200 tons, to the Phoenix Bridge Co.

New York Central, bridge repair work, 200 tons, to the Phoenix Bridge Co.

Queen's subway, section 2, 4400 tons, Jobson-Gifford Co. low bidder.

Paper-Calmenson Co., warehouse, St. Paul, Minn., 212 tons, to St. Paul Structural Steel Co.

Swift & Co., eight 80-ft. deck plate girder spans for approach to Mississippi River bridge for St. Paul Bridge & Terminal Co., 403 tons, to Wisconsin Bridge & Iron Co. instead of to Milwaukee Bridge Co. as reported last week.

Two public schools, Indianapolis, 350 tons, to Robert Berner Structural Steel Co.

Riley Hospital, Indianapolis, 132 tons, to Hetherington & Berner.

Big Four Railroad, bridge work, 535 tons; 375 tons, to McClintic-Marshall Co., 96 tons, to Fort Pitt Bridge Co., 52 tons, to American Bridge Co., and 12 tons, to Mt. Vernon Bridge Co.

Power plant, Camden, N. J., 8000 tons, bids taken Nov. 5.

Gas holder, at Birmingham, 1000 tons, to Stacey Brothers Gas Construction Co.

National Plate Glass Co., (General Motors Corporation) Detroit, plant at Blairsville, Pa., 1200 tons, to McClintic-Marshall Co.

Herbst Department Store addition, Fargo, N. D., 133 tons, to St. Paul Foundry Co.

City of Portland, Ore., Bull Run Pipe Line, No. 3, 129 tons, to Poole & McGonigle.

National Plate Glass Co., plant addition, Blairsville, Pa., 1238 tons, to McClintic-Marshall Co.

Financial Center Building, Seventh and Spring Streets, Los Angeles, 794 tons, to Baker Iron Works.

Second unit, Dexter-Horton Building, Seattle, Wash., 283 tons, to Wallace Equipment Co., Seattle.

John Marshall High School, Minneapolis, 221 tons, to Crown Iron Works.

Red River Power Co., Grand Forks, N. D., concrete pit and arrangement of conveyor and coal crusher, 120 tons, to Fargo Foundry Co., Fargo, N. D.

St. Paul Bridge & Terminal Railroad, bridge, 400 tons, to Wisconsin Bridge & Iron Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

Marlborough Building, Broadway and Thirty-sixth Street, New York, 5000 tons.

American Telephone & Telegraph Co., New York, building, 18,000 tons.

High school, Fall River, Mass., 300 tons.

High school, New York, 3000 tons.

High school, Brooklyn, 1200 tons.

Bell Telephone Co., two buildings in Philadelphia and one in Camden, N. J., 1800 tons.

Power plant, Camden, N. J., 8000 tons, bids open Nov. 5.

The Great Northern Railroad, works, 1300 tons.

Pennsylvania Railroad, Northwestern Region, one two-track and one six-track viaduct, Fifty-sixth Street, Chicago, 350 tons.

Standard Oil Co., Cleveland, two crane runways, 550 tons.

RAILROAD EQUIPMENT BUYING

C. & O. in Market for 2000 Gondolas—B. & O. Buys 1000 Car Bodies—Locomotive Inquiries

The expected car and locomotive buying program of the railroads is beginning to develop. The Baltimore & Ohio has placed orders for 1000 car bodies. The Chesapeake & Ohio is inquiring for 2000 gondolas and the Wabash for 1750 car bodies. In addition to the inquiry of the Union Pacific for 60 locomotives, there are tentative inquiries for 150 from three roads. Considerable locomotive buying is expected.

The railroads on Oct. 15 had 10,509 locomotives in need of repair, an increase of 686 over the number in need of repair on Oct. 1, and 16.4 per cent of the total number on line, according to the Car Service Division of the American Railway Association, which also reports that freight cars in need of repair on Oct. 15 totaled 155,637, or 6.9 per cent of the total number on line, this being an increase of 4305 over the number in need of repair on Oct. 1.

The Baltimore & Ohio has awarded 500 hopper car bodies to the Pressed Steel Car Co. and 500 box car bodies to the American Car & Foundry Co.

The Union Pacific is inquiring for 60 locomotives.

The Chesapeake & Ohio is inquiring for 2000 gondolas.

The Wabash is inquiring for 1750 automobile cars and will soon enter the market for 250 70-ton gondola cars.

The St. Louis-San Francisco has decided not to buy 2500 refrigerator cars on which it recently took figures.

The Northern Pacific is inquiring for 1000 underframes for ore cars.

The Louisville, Henderson & St. Louis has ordered 2 coaches, 2 compartment coaches and 3 baggage and mail cars from American Car & Foundry Co.

The Baltimore & Ohio is inquiring for 50 coaches and 4 dining cars.

The Seaboard Air Line is inquiring for 3 combination baggage and mail cars and 1 to 3 horse cars.

The Alabama & Vicksburg is inquiring for 200 box cars of 40-tons capacity and 100 composite gondola and 100 flat cars of 50-tons capacity.

The Cambria & Indiana has placed repairs on 100 to 250 hopper cars with American Car & Foundry Co.

The Southern Pacific has ordered 20 switching locomotives of the 6-wheel type from Lima Locomotive Works.

The Minnesota Steel Co. has placed 1 locomotive with Baldwin Locomotive Works.

The Nashville, Chattanooga & St. Louis is inquiring for 100 combined ballast and coal cars.

NON-FERROUS METALS

The Week's Prices

Cents per Pound for Early Delivery							
	Copper, New York		Straits Tin	Lead		Zinc	
	Lake	Electrolytic*	New York	New York	St. Louis	New York	St. Louis
Oct.							
31.....	13.00	12.25	41.75	6.75	6.45	6.67½	6.32½
Nov.							
1.....	13.00	12.37½	41.85	6.75	6.45	6.70	6.35
2.....	13.00	12.37½	41.50	6.75	6.45	6.70	6.35
3.....	13.00	12.37½	...	6.75	6.45	6.70	6.35
5.....	13.00	12.37½	41.87½	6.75	6.45	6.70	6.35

*Refinery quotation; delivered price 1/4c. higher.

New York

NEW YORK, Nov. 5.

None of the markets is particularly active and prices are a little higher in some of them. Buying of copper has been fairly active and the tin market has shown some life. There is very little change in lead and the zinc market is holding its own.

Copper.—The turn for the better in the electrolytic copper market, noted a week ago, has made fair progress and sales of from 25,000,000 to 30,000,000 lb. are estimated to have been made last week, largely to domestic consumers. The price has also stiffened until 12.62 1/2c., delivered, is the minimum with some companies taking no orders at less than 12.75c., delivered. There continues to be considerable inquiry before the market and prospects for further sales are fairly good. The key to the entire situation, however, is the rate of production which continues unchecked. Until this is curtailed it is difficult to see how any sustained rise in the market can be long lived.

Copper Averages.—The average price of Lake copper for the month of October, based on daily quotations in THE IRON AGE, was 13.21c. The average price of electrolytic copper was 12.58c., refinery, and 12.83c., delivered.

Tin.—A fairly good business in Straits tin was done last week. About 300 tons changed hands on Oct. 31, bringing the total turnover for the three days, Oct. 29 to 31, to about 700 tons. On Nov. 1 and 2 also transactions involving about 100 tons were recorded daily. The premium on spot delivery has practically disappeared. On the New York Metal Exchange the inauguration of two calls per day on Oct. 29 has brought a moderate revival of business with a turnover of about 300 tons for the week. Spot Straits tin today was quoted at 41.87 1/2c., New York, and prices in London were £208 5s. for spot standard, £207 7s. 6d for future standard and £209 for spot Straits, all about £2 per ton higher than a week ago. Statistics for the month of October show that deliveries for the month were 5540 tons, with 3677 tons in stock and landing on Oct. 31. The October imports were 6855 tons, making the total for the first ten months 58,532 tons.

Lead.—The market is very quiet and steady, with practically no developments having an influence on the course of prices. These are unchanged from a week ago with quotations in the outside market with 6.45c., St. Louis, and 6.75c., New York. The quotation of the leading interest is also unchanged at 6.75c., New York.

Zinc.—The market is a little stronger but still exceedingly quiet. Prime Western for early delivery is quoted at 6.35c., St. Louis, or 6.70c., New York. Current transactions are limited to 100 tons in carload lots which are few in number and there is practically no demand from foreign consumers.

Nickel.—Quotations for shot and ingot nickel are unchanged at 29c. to 32c. per lb., with electrolytic nickel held at 32c. by the leading producers. In the outside market both shot and ingot nickel are quoted at 29c. to 32c.

Antimony.—The market is stronger and there is fear of a shortage before the end of the year. There are no offerings at less than 9c., duty paid, for less than wholesale lots, with jobbing lots bringing 9.25c. to 9.75c.

Aluminum.—Virgin metal, 98 to 99 per cent, is

quoted by importers at 25c. to 26c. per lb., duty paid, New York, with some sellers unable to obtain the metal from their foreign representatives.

Old Metals.—The market is very unsettled. Dealers' selling prices are nominally as follows:

	Cents Per Lb.
Copper, heavy and crucible.....	12.25
Copper, heavy and wire.....	11.25
Copper, light and bottoms.....	9.75
Heavy machine composition.....	9.75
Brass, heavy.....	7.25
Brass, light.....	6.00
No. 1 red brass or composition turnings..	8.25
No. 1 yellow red brass turnings.....	6.50
Lead, heavy.....	6.50
Lead, tea.....	5.50
Zinc.....	5.00
Cast aluminum.....	16.25
Sheet aluminum.....	16.25

Chicago

CHICAGO, Nov. 5.—Tin, zinc and antimony have advanced while copper and lead have declined. Zinc has been strengthened by foreign buying. Antimony has advanced following the disappearance of foreign offerings of that metal. The market is generally somewhat more active, the railroads particularly being prominent purchasers. The old metal prices remain unchanged. We quote in carload lots: Lake copper, 13.25c.; tin, 42.75c.; lead, 6.50c.; spelter, 6.40c.; antimony, 10.50c., in less than carload lots. On old metals we quote copper wire, crucible shapes and copper clips, 10c.; copper bottoms, 8.75c.; red brass, 8c.; yellow brass, 6c.; lead pipe, 5c.; zinc, 4c.; pewter, No. 1, 22c.; tin foil, 30c.; block tin, 35c.; all buying prices for less than carload lots.

STEEL AND INDUSTRIAL STOCKS

The range of prices on active steel and industrial stocks from Monday of last week to Monday of this week was as follows:

	Low	High		Low	High
Allis-Chalmers ..	37	41 1/2	Int. Har. pf.....	106 1/4	107 1/4
Allis-Chal. pf....	89 1/4	90	Jones & Laughlin..	107 1/2	107 1/2
Am. B. S. & Fdy. 70 1/4	72 1/4		Lima Loco.....	63 1/2	66 1/2
Am. B. S. & F. pf. 104 1/4	104 1/4		Midvale Steel....	24 1/4	26 1/4
American Can....	90 1/2	99 1/4	Nat.-Acme	7 1/4	8 1/4
Am. Can pf.....	106 1/4	107	Nat. En. & Stm. 39 1/2	42 1/2	
Am. Car & Fdry. 155	160 1/2		N. Y. Air Brake 33 1/4	37	
Am. C. & F. pf. 121 1/4	121 1/4		Otis Steel.....	7	8 1/4
American Loco..	68 1/4	72 1/2	Otis Steel pf.....	45	47 1/2
Am. Radiator....	79 1/4	80 1/4	Pressed Stl. Car 50 1/2	55	
Am. Stl. Fdries. 83 1/4	86 1/4		Pressed Stl. pf. 85	85	
Am. Stl. Fd. pf. 100 1/4	100 1/4		Replogie Steel....	8	9 1/4
Baldwin Loco....	115 1/4	124	Republic	41 1/2	46
Baldwin Loco pf. 113	113		Republic pf.....	88	90
Bethlehem Steel. 46 1/4	49 1/4		Sloss-Sheffield ..	42	45
Beth. Stl. 7% pf. 88 1/4	89 1/4		Steel of Canada. 65 1/4	69 1/4	
Beth. Stl. 8% pf. 104	104		Un. Alloy Steel..	30	31 1/4
Br. Em. Stl. 1 pf. 55 1/2	55 1/2		U. S. Pipe.....	35 1/4	38 1/4
Chic. Pneu. Tool 79	82		U. S. Pipe pf....	80 1/4	81
Colo. Fuel.....	20	24 1/4	U. S. Steel.....	86 1/4	93 1/4
Crucible Steel... 57 1/4	63 1/4		U. S. Steel pf....	118	119
Crucible Stl. pf. 87	91 1/4		Vanadium Steel. 27 1/4	29 1/4	
Gen. Electric.... 170 1/4	182 1/4		Va. I. C. & Coke 54	54	
Gt. No. Ore Cert. 28 1/4	30 1/4		Whouse Air Br. 79	79 1/4	
Gulf States Steel 71 1/4	78 1/4		Y'gtown S. & T. 63	64 1/4	
Int. Har.....	66 1/4	75 1/4			

Steel and Iron Companies' Reports

Net income of the Inland Steel Co. for the nine months ended Sept. 30 was \$3,731,356, after interest, depreciation, depletion and taxes, equivalent after preferred dividends to \$2.85 per share on 1,182,799 shares of common stock. The regular quarterly dividend of 62 1/2c. on common and \$1.75 on preferred was declared.

The American Steel Foundries report net profit for the nine months ended Sept. 30 of \$5,724,044, after charges and Federal taxes. This compares with net profit of \$2,317,357 in the corresponding period of 1922. Net earnings after deductions for operating expenses and Federal taxes amounted to \$6,822,270 as compared with \$3,157,463 in the previous year.

Third-quarter report of the M. A. Hanna Co. shows total net income of \$679,936, after interest, depreciation, Federal taxes, etc., equivalent after preferred dividends to \$1.47 per share on the outstanding 282,844 shares of no par common stock. Total net income for the first nine months of 1923 was \$1,938,137, or \$4.82 per share on common stock, after allowance for preferred.

Net income of the Reynolds Spring Co. for the third quarter was \$112,753, after depreciation and Federal taxes, compared with \$121,529 in that period of 1922. Net income for the first nine months of the year after depreciation and Federal taxes was \$250,786 against \$187,294 in 1922.

PERSONAL

Edward L. Garihan, for a number of years connected with the Bethlehem Steel Co. in various capacities, and also sales manager of the Tioga Steel & Iron Co., has been appointed sales manager of the Chrome Steel Works, Carteret, N. J.

D. P. Bennett, who has been a vice-president of the Pittsburgh Steel Co. for some time, has been elected president of the company, succeeding Willis F. McCook, who died several months ago. All former directors were re-elected and H. J. Miller, secretary of the company, was elected director to succeed Mr. McCook. E. H. Bindley was elected vice-president. Mr. Bennett has been identified with the Pittsburgh Steel Co. for nine years, first as vice-president and treasurer, later giving up the latter position to give his entire time to the vice-presidency. He was born in Leith, Scotland, in 1865 and attended the public schools. His first business experience was in the office of commission merchants in Glasgow, where he remained until he left for America in 1890. He then became identified with the National Railroad Co. of Mexico, starting as stenographer. In December, 1891, he was transferred to Mexico City, where he filled various positions, latterly assistant to the president, until April, 1906, when he became vice-president of the company with headquarters in New York. On the reorganization of the railroad in 1908, he was made vice-president of the new company, retaining that position until 1914, when he resigned and moved to Pittsburgh to join the Pittsburgh Steel Co.

Thomas B. Miller has been appointed general manager of the Powers Foundry Co., Elkton, Md.

H. B. Ackland, mechanical engineer connected for several years with Westinghouse, Church, Kerr & Co. as engineer-in-charge, has been appointed New York manager of the G. H. Williams Co., Erie, Pa.

Albert W. Gray, works manager Billings & Spencer Co., Hartford, Conn., has resigned to join the Bristol Brass Co., Bristol, Conn., in the same capacity, succeeding John W. Wade, who takes on property management, allowing more time for his duties as mayor of the city. Mr. Gray was for several years hydraulic engineer for Stone & Webster, Boston, and prior to that was engaged in hydraulic work for Western bankers. No successor to Mr. Gray will be named, his duties being assumed by President F. C. Billings.

R. A. Olsen has been appointed sales manager for the Tuthill Spring Co., Chicago, succeeding H. C. Wright, who has entered another field.

G. M. Youngkrantz has been added to the Chicago sales force of the Tuthill Spring Co. and will probably call on the jobbing trade of the west, north and central territory.

Edward M. Woodward, Jr., has been elected president and treasurer of the Woodward & Powell Planer Co., Worcester, Mass., succeeding in both offices his father, the late Edward M. Woodward. John W. Robinson, who was secretary, has been made secretary and vice-president, succeeding in the latter office Edward M. Woodward, Jr.

James J. Dale has resigned as vice-president in charge of sales and director of the Consolidated Machine Tool Corporation of America, 17 East Forty-second Street, New York.

Roy M. Ellis, who was connected with the Brown & Sharpe Mfg. Co., Providence, R. I., for seven years in various capacities, has been appointed New England sales manager for the Calorizing Co., Pittsburgh. During the World War he was general manager of the A. H. Fox Gun Co. and subsequently was engaged as industrial engineer with the Industrial Co., Boston, where he will locate his present headquarters.

B. F. Murdock, formerly associated with the Debevoise-Anderson Co., Inc., Boston, is now with John Tredennick, that city.

T. J. McCormack has resigned as hydraulic engineer of the Wellman-Seaver-Morgan Co., Cleveland and has become affiliated with the S. Morgan Smith Co., York, Pa., manufacturer of hydraulic turbines.

Gunnar Dillner, president Trafikaktiebolaget Grangesberg-Oxelösund, Stockholm, Sweden, and S. Frisell of the same company, who have been in the United States for three weeks in the interest of Swedish iron ore, have sailed on the steamship Berengaria.

Slump in British Shipbuilding

The tonnage of vessels actually under construction in British yards at the end of September, 1923, is the smallest for 14 years, according to an analysis of Lloyd's shipbuilding returns by the Transportation Division of the Department of Commerce. The figure given—1,271,195 tons—includes 242,000 tons on which work has been suspended.

A specific illustration of the present condition is shown by the fact that launchings on the Clyde during the quarter ended Sept. 30 totaled 27 vessels of 10,565 gross tons. Thus, for three months' tonnage leaving the ways was about equal to two medium-sized cargo vessels, but actually was spread over 27 craft.

While the immediate cause of this situation is generally regarded as the long-drawn-out dispute with the Boilermakers' Society, many claim that the real trouble lies deeper and that the dispute has been allowed to drag on because this period of poor business was regarded by employers as an opportune time for a fight to the finish on an old issue.

Canadian Scrap Market

TORONTO, ONT., Nov. 5.—While a stronger undertone is beginning to make its appearance in the Canadian iron and steel scrap market, business in general is without feature. Melters are entering the market from time to time but in practically all cases orders are confined to small tonnages and future buying is backward. As a result of the limited demand for scrap trading is quiet, even between dealers, and the latter are only taking in material at prices below the present market level or when they see prospects of an immediate turnover.

Dealers' buying prices are as follows:

	Toronto	Montreal
	Gross Tons	Gross Tons
Steel turnings	\$10.00	\$7.00
Machine shop turnings.....	10.00	7.00
Wrought pipe	8.00	8.00
Rails	12.00	13.00
No. 1 wrought scrap.....	14.00	14.00
Heavy melting steel.....	12.00	11.50
Steel axles	15.00	18.00
Axles wrought iron.....	18.00	20.00
	Net Tons	Net Tons
Standard car wheels.....	15.00	16.00
Malleable scrap	15.00	16.00
Stove plate	15.00	16.00
No. 1 machinery cast.....	20.00	20.00

Heavy Loading of Cars

Loading of revenue freight for the week of Oct. 20 continued at record levels, compared with preceding years, the total for the week being 1,072,881 cars.

Although this was 24,393 cars below the week of Sept. 29, when 1,097,274 cars were loaded, the greatest for any one week in history, the total for the week of Oct. 20 was considerably above any week in previous years.

The number of cars loaded in the Eastern district was an increase of 7.1 per cent over the same week last year, while in the Southern district an increase of 7.9 per cent was reported. In the Western district there was an increase of 10.2 per cent. The total for the week of Oct. 20 was an increase of 82,992 cars over the corresponding week in 1922 and an increase of 108,070 cars over the corresponding week in 1921.

This was the eighteenth week this year that loading of revenue freight has exceeded 1,000,000 cars.

OBITUARY

EDGAR A. STRONG, president Strong, Carlisle & Hammond Co., Cleveland, and first president of the National Supply and Machinery Dealers' Association, brief mention of whose death was



EDGAR A. STRONG

made in *THE IRON AGE* of last week, was 82 years old and was engaged in the machinery and mill supply business in Cleveland 36 years as head of one of the largest machine tool and factory supply distributing companies in the Central West. He was born near Manchester, Conn., in 1841. After serving through the Civil War, he located in Cleveland, where he was connected with the William Bingham Co., hardware jobbers, for 20 years. Later he formed a partnership with R. H. Carlisle and W. J. Turney to handle mill supplies. Mr. Turney was soon succeeded

by L. H. Hammond, who entered the employ of the company upon its formation and the three men continued their close affiliation as officers of the company for 36 years from its organization until Mr. Strong's death. Mr. Strong was very active in the organization of the National Supply and Machinery Dealers' Association, which was formed in 1905 and, after his retirement as its first president, continued to serve as a member of the advisory board, composed of past presidents, up to the time of his death. Mr. Strong enlisted with the Sixteenth Regiment of Connecticut Volunteers in 1862 and attained the rank of first lieutenant. The last 11 months of the Civil War he spent in seven different Southern prisons. He was a man of lovable character and leaves a host of friends. He was a member of the Union Club, Chamber of Commerce and Old Colony Club of Cleveland. A daughter and one son, Herbert W. Strong, secretary of the Strong, Carlisle & Hammond Co., survive. The latter also has been very active in the National Supply and Machinery Dealers' Association and served three years as its president, being first elected in 1916.

JOHN W. HARRISON of St. Louis, a pioneer Missouri manufacturer, whose iron and steel products were converted into shot and shell during the Civil War, and into water mains and reinforced structures during the early building days of St. Louis, died Oct. 30, aged 83. He entered the State University at Columbia, Mo., from which he was graduated in 1858. A year later he removed to St. Louis and after taking a special commercial course, went to Irondale, Mo., where he was made superintendent of the Irondale Furnace Co., a position which he held until 1865. It was during this period that his company was engaged in the manufacture of guns and ammunition for the war. He was made vice-president of the Shicle-Harrison-Howard Iron Co. in 1867 and was identified with the firm until 1900. In 1890 he organized the Howard-Harrison Co. of Bessemer, Ala., and was instrumental in building up a large foreign trade, especially with Mexico. He was elected president of the Hillman Land & Iron Co. in 1898 and was active in all his enterprises until he retired in 1906.

WILLIAM F. WENDT, founder of the Buffalo Forge Co. and a lifelong resident of Buffalo, died at his home, 570 Richmond Avenue, on Oct. 30, aged 65 years. He had been ill for some time. In 1877 Mr. Wendt founded the Forge company and served as president until his retirement in 1916. In that interval he became an active figure in several other companies, including the

Buffalo Steam Pump Co., the George F. Squier Mfg. Co. and the Carrier Air Conditioning Co. Several years ago he became interested in the development of South American trade and in 1905 he founded a publication printed in Spanish and Portuguese in the interest of South American business. Besides his widow, one daughter survives. Henry Wendt, a brother, is now president of the Buffalo Forge Co.

MICHAEL BARTHOLOMEW RYAN, inventor of an electric automatic chain welding machine, died Oct. 31, at his estate at Milford, Conn. He was born in Richmond, Va., 60 years ago.

FRANKLIN P. CARTER, treasurer and general manager Carter & Hakes Mfg. Co., Winsted, Conn., milling machines and special machinery, died at his home in Winsted, Oct. 30, in his seventy-first year. As a boy Mr. Carter was employed by the Pratt & Whitney Co., Hartford, Conn., and remained in that city until 1899, when he moved to Winsted and helped organize the company in which he was active the remainder of his life.

JOSEPH NESBITT, president Western Heavy Hardware Co., Oakland, Cal., died at the Merritt Hospital in that city on Oct. 24, as a result of injuries sustained when struck by an automobile. He was 69 years of age and had been head of the company for many years.

JOHN EDWARD STEAD, former president of the Iron and Steel Institute (British) and brother of the noted journalist, W. T. Stead, died at his home at Redcar, Yorkshire, England, on Oct. 31, after a long illness. Mr. Stead was an acknowledged authority in England on the metallurgy of steel and was well known for his work as metallurgical chemist. He was the recipient of numerous honorary degrees in science. He was born in 1851.

JOSIAH G. MUNRO, for many years treasurer of the Punxsutawney Iron Co., died in Boston on Nov. 2, aged 75 years. He was founder of the Buffalo Arms Co.

RICHARD THEW, founder of the Thew Shovel Co., Lorain, Ohio, died at Fresno, Cal., Nov. 1, age 77 years.



J. E. STEAD

Mill Activities in the Mahoning Valley

YOUNGSTOWN, Nov. 5.—Rolling mill schedules are still on a declining basis in the Mahoning Valley. The Republic Iron & Steel Co. has suspended the eight active sheet mills which it has been maintaining in operation at its Niles works. The Youngstown Sheet & Tube Co. has suspended a lapwell tube mill and its 110-in. plate mill.

Of 120 sheet and jobbing mills in the Mahoning Valley, 63 were scheduled at the beginning of the week, and 15 of 17 pipe mills. The sheet mill schedule is the lowest in the past year and a half.

Stockholders of the Northway Motors Corporation, Natick, Mass., trucks, have voted to merge with the Amalgamated Motors Corporation. Under plans outlined by P. W. Hansel, president Bessemer American Motors Corporation, at the Northway stockholders' meeting last week, Northway stock will be exchanged for Amalgamated, the Natick company's \$200,000 debt will be liquidated, and production increased.

Building permits issued in Milwaukee from Jan. 1 to Nov. 1 aggregated \$35,560,485 in value, and a total of \$42,000,000 is predicted for the entire year by W. D. Harper, building inspector. The best previous year, 1922, produced an aggregate of \$26,489,643.

COMPUTING MACHINE ECONOMY

Formulas Worked Out by Engineers Discussed at Material Handling Conference

Formulas recently completed for computing economies of labor-saving equipment were discussed at a conference of the material handling division of the American Society of Mechanical Engineers, held in the Engineering Societies Building, New York, Nov. 2.

The need of such formulas and their value to both the prospective user and the seller of equipment were emphasized. A letter from another association asking for data as to the conserving of labor by labor-saving devices brought out the fact that there was extreme difficulty in getting scientific data on the amount of labor saved. Undertaking representative researches as to cost, concentrating at first on a specific field, was discussed, and a program of research into truck transportation costs was put before the meeting.

Obtaining fundamental information for applying the formulas was considered by the chairman of the division, H. V. Coes, Ford, Bacon & Davis Co., New York, as a next step, and the appointment of a committee for that purpose was proposed. Getting the ultimate cost per unit of product handled was emphasized as the chief problem, it being difficult at present to obtain the information for making a comparison on a true basis.

A motion was made to have printed copies of the formulas sent out to manufacturers with an invitation to discuss them at the annual meeting of the society in December. Stimulation of the active interest of the local sections of the society in the subject was discussed and cooperation with other societies suggested.

In its work the division found it necessary to have a standard method to yield results truly comparable, and mathematics are combined with economics to produce the desired results. Although devised for use of the materials handling division, it is felt that the fundamental economics as set up in mathematical form are applicable to most cases in which a difference in labor is obtained by the new method as compared with the old, whether it be a material handling device, a machine tool or a new process or method. An abstract of the formula follows:

The whole problem is considered to be one of comparative costs. While it has been customary to charge factory burden or factory overhead to the labor-saving devices, it has not been customary to credit the labor-saving device for its portion of overhead saved, which generally is proportional to the difference in labor, since there is usually a definite relationship between labor and overhead.

In computing the costs, very frequently the labor to be saved has been classed as indirect or non-productive labor and as such is a part of the overhead or burden and should, therefore, not bear any superimposed charge from the other components of the overhead, as this would be pyramiding the charges. But where comparative costs of the economics are desired, then the indirect or non-productive labor should be charged with all the other component parts of the overhead with the exception of itself.

Two common mistakes then have been made, rendering it difficult to secure proper comparative results and frequently obscuring the issue: (1) The omission of burden or overhead charges on that portion of labor saved in comparing costs. (2) The omission of burden charges on indirect labor in comparing costs, although they were added to the direct labor.

The following rule, therefore, for setting a value upon labor saved by an improved process has been evolved: Whatever valuation is arrived at in cost accounting as the cost per unit of labor used in production also establishes the value per unit of labor saved by an improved process. For simplicity, no monetary value need be placed upon labor employed in comparative processes, except upon the amount of difference in labor required at the current rate and plus "burden" or an equivalent.

Other items of cost should in like manner be accounted at the same rate as for similar items in making up the cost of product.

In calculating comparative cost, a new item is introduced which very likely becomes a factor in regular cost accounting and which the engineers and economists recognize, namely, the monetary value of increased production. Improved methods or devices will reduce the cost of making an article, since more are produced in a stated time, which is the same as reduction in one or more of the items of directly applicable cost. The rule is therefore: In a comparative accounting, increased production will always carry a higher value than that attached to normal production.

With the above consideration as a foundation, the for-

mulas for calculating economics of labor-saving equipment are set forth herewith. Let:

Debit Items—

- A = percentage allowance on investment
- B = percentage allowance to provide for insurance, taxes, etc.
- C = percentage allowance to provide for upkeep
- D = percentage allowance to provide for depreciation and obsolescence
- E = yearly cost of power, supplies and other items which are consumed, total in dollars

Credit Items—

- S = yearly saving in direct cost of labor in dollars
- T = yearly saving in fixed charges, operating charges or burden, in dollars
- U = yearly saving or earning through increased production, in dollars

X = percentage of year during which equipment will be employed

I = initial cost of mechanical equipment

Results—

- Z = maximum investment in dollars justified by the above consideration
- Y = yearly cost to maintain mechanical equipment ready for operation
- V = yearly profit from operation of mechanical equipment.

Then

$$Z = \frac{(S + T + U - E)X}{A + B + C + D} \quad (1)$$

$$Y = I(A + B + C + D) \quad (2)$$

$$\text{and } V = [(S + T + U - E)X] - Y \quad (3)$$

Feeling that handling machinery, even if left idle a large part of the year, would probably require, under most conditions, approximately the same repair through deterioration as though in use, the committee makes no deduction for such lack of use in the estimated cost of upkeep C. If greater accuracy be considered necessary, use C multiplied by X in place of C in the formulas.

Applications of the formulas are given in the report.

GERMAN IRON AND STEEL MARKET

Wolff May Furnish Pig Iron to Russia—Bars, Sheets and Iron Active

(By Radiogram)

BERLIN, GERMANY, Nov. 5.—The market is quiet, except for pig iron, bars and sheets, for which there is good demand. The pig iron and steel syndicates' prices, which now are quoted in gold marks, are unchanged. But manufacturers of tools and other finished iron and steel goods have announced price cuts averaging one gold mark per kilogram (10% c. per lb.).

The locomotive market is stagnating; there is great difficulty in getting export orders.

Ruhr production question still is unsettled. There are 340,000 unemployed on the Ruhr, omitting Essen.

Soviet newspapers report that Otto Wolff of Cologne has offered to supply Russia's pig iron deficiency for five years on credit, taking in exchange ore mining concessions.

The plant of the Barney & Smith Car Co., Dayton, Ohio, will again be offered for sale at public auction, Dec. 5. It is reported that one of the larger railroad companies is desirous of purchasing the property, and the sale was ordered to give it an opportunity to make a bid.

The American Locomotive Co., 30 Church Street, New York, has placed its Pittsburgh plant on the market, comprising a number of buildings and 10 acres of land, and will discontinue operations entirely at this point. The works have been closed for some time past.

The plant of the Gramm-Bernstein Co., Lima, Ohio, motor trucks, will be offered for sale Nov. 15 by order of the Federal Court. E. G. Kirby is receiver of the company.

Electric Furnace Types Surveyed

Advantages and Disadvantages of Various Forms for Foundry Use—Arc, Resistance and Induction Furnaces Compared from Many Angles

BY LEONARD W. EGAN*

ELECTRIC furnaces far outclass the best production practice of any of the combustion furnaces in every factor, and from every standpoint, except perhaps the first cost of the installation. They greatly simplify the labor problem and render the manager independent of the melter. They permit the routine repetition of the melting schedule, which has been reduced to the mere charging of the metal into the furnace, stirring and skimming it if necessary and, when melted, pouring it. The time and temperature of pouring are decided by pyrometer and can be placed under the eye of the manager or superintendent at all times.

It is conservative to say that the metal can be melted for half the cost of that of combustion furnace practice, considering the cost of fuel, metal loss, upkeep, etc., and this, not considering the indirect savings in the improvement of the product, uniformity, reduction of rejections, satisfaction of the customer, savings in floor and storage space, absence of worry, and so on. The improvement in working and sanitary conditions in the foundry, brought about by the use of the electric furnace, are highly important items, there being absence of noise, heat and fumes.

Consideration of Furnace Types

There are four principal types of electric furnaces in use in this branch of melting: the open arc, the muffled or smothered arc, the resistance and the induction furnaces. The direct or open arc furnaces are represented by a number of makes and types such as the Snyder, the Booth-Hall, the Volta, the Geolette, etc. The Geolette furnace, however, is in general use for brass melting by the arc process. The muffled arc furnace is represented by one type only, the General Electric. The resistance furnace is also represented by one type only, the Bailey. The induction furnace is represented by two types, the Ajax-Wyatt and the General Electric.

In this discussion we are considering only the four principal type furnaces, applicable to the brass and aluminum foundry. They are the rocking arc furnace, the muffled arc furnace, the resistance furnace and the induction furnace. The four types represent practically the entire field of commercial electric melting, and the few vertical electrode furnaces of the steel melting type in use in melting non-ferrous metals have not been considered.

Rocking Arc Furnace

The rocking arc furnace was developed by Dr. Geolette of the Bureau of Mines, Washington, during the war. A patent taken out on the furnace was donated later to the American public. Thus any one desiring to use the furnace may do so. The rocking mechanism was developed by the General Electric Co. The furnace is made by the Detroit Electric Furnace Co., Detroit.

A horizontal cylinder with a refractory lining, the furnace has a horizontal electrode passing through a round opening directly in the center of each of the cylinder ends. A hand wheel is provided for moving the electrodes in and out. An arc is formed in the center of the furnace, the heat of which is radiated to the walls and the bath. The furnace rests on a roller mechanism somewhat similar to that of the metal mixer in the steel plant. This rotates the fur-

nace in one direction, then reverses and rotates it in the other. In this way heat is transmitted from the arc to the walls of the furnace, and is in turn wiped off the wall by the metal as it passes over it. In addition, heat is radiated to the bath directly from the arc. The arc does not come in contact with the bath, as in the steel melting furnaces, and in reality the furnace is of the indirect arc type.

Principal advantages claimed for this type of furnace are the low kw/hr. consumption per ton of metal melted, the ability to melt all grades of scrap and turnings and the speed of melting. This furnace is most rapid in its action and, for heavy production, has the largest capacity per unit of any of the four types mentioned.

Some of its disadvantages are the proximity of a high temperature arc to the metal; the hand operation of the electrode; the necessity of pouring the heat when it is melted and the dependance of the furnace upon the rocking mechanism and water cooling at the electrode ports. The furnace is made in large and small units, as low as 200 lb. capacity, single phase. The current consumption is in the neighborhood of 200 to 225 kw/hr. per ton. All of the metal may be poured, if desired, at each heat.

Muffled Arc Furnace

As developed by the General Electric Co. during the war, in the large size only, the muffled arc furnace was a combination of smothered arc and resistance type. Later on other types were made in smaller units, having a hearth capacity of about 950 lb. and a melting rate of 500 lb. per hr. The furnace is two phase, arranged with a cross electrode embedded in the brickwork of the hearth, which connects with the two bottom electrode blocks. The return of the two-phase current supply is fastened to this cross electrode.

Heat is generated by two short arcs drawn between the upper electrodes and the bottom electrode blocks; the arcs are smothered by crushed carbon which surrounds the arcs. Heat is transmitted to the metal by contact with the heated bottom electrode blocks, which are in direct contact with the bath; some heat is given off by radiation of the arcs and reflected by the roof. The furnace has motor-operated electrode regulators, is hand tilting and arranged for water-cooling of the electrode ports.

The consumption on daylight melting is 400 kw/hr. per ton for yellow brass (60/40) and 470 kw/hr. per ton for red brass (80/20.) The furnace has a rating of 120 kw. in transformer capacity. The hearth capacity is approximately 1000 lb., with a melting capacity of 500 lb. per hr., the melting practice being to pour only 500 lb. of the hot metal, charging the same amount of cold metal into the unpoured remainder of the bath. The furnace operates at a power factor of approximately 95 per cent.

Some of the advantages claimed for the furnace are a large source of heat, at a comparatively low temperature; ability to measure and control the temperature of the metal; a neutral or reducing atmosphere; freedom from contaminating gases, freedom from agitation of the bath, allowing the dirt and slag to float to the surface, where it can be skimmed off, etc.

Some of the disadvantages are the proximity of an arc to the metal in the event the arc is not properly smothered; water-cooling of the electrode ports;

*Special engineer Ohio Steel Foundry Co., Lima, Ohio. This is taken from a paper on "Complete Electrification of the Foundry Industry," read at the Buffalo convention of the Association of Iron and Steel Electrical Engineers.

trouble in holding the unpoured heat for long periods of time; amount of auxiliary equipment, etc.

Baily Resistance Furnace

The Baily resistance furnace was developed by the Electric Furnace Co., Alliance (now of Salem), Ohio, somewhat earlier than either of the two preceding types. The furnace is made in different sizes, the one in most general use having a hearth capacity of 1500 lb., a melting rate of 500 to 800 lb. per hr., and approximately 100 kw. in transformer capacity. Briefly, it is a circular shell with a refractory lining, hand tilting and arranged so that the roof can be raised by a hand-wheel for renewing the resistor material. A trough of silicon carbide, filled with crushed carbon, forms the resistor or heating element.

Heat is radiated by the carbon resistor to the roof and is reflected to the bath; some heat is also radiated from the sides of trough to the bath. The trough itself becomes conductive after being heated, and forms a part of the resistor, a portion of the current being carried by it. It is customary to pour the entire bath each heat, the time of which is about 2 hr. Cold stock is then charged into the furnace, stirred and skimmed when necessary, then poured.

Current consumption is approximately 300 kwhr. per ton and the metal loss under one per cent. The furnace requires no auxiliary apparatus or water-cooling, it is single phase and operates at approximately unity power factor, the nature of the load being comparable to the same capacity of incandescent lighting. Secondary taps are brought out from the secondary of the transformer to points on a hand-operated switch. The voltage, varied by moving the switch from point to point, controls the electrical input and the temperature of the furnace.

Advantages claimed for this type of furnace are uniformity of the metal by reason of the soft reflected heat; the temperature of the roof, the hottest part of the furnace, does not exceed that of the bath by more than 300 deg. Fahr., the metal can be skimmed and stirred at will; the unpoured heat can be held indefinitely without disturbing the metal composition; a neutral or reducing atmosphere; absence of contamination from gases; complete control of the temperature and manipulations; flexibility of operation; low metal loss; absence of auxiliaries and moving parts, etc.

Some of the disadvantages are that the roof must be raised and fresh carbon added to replace wastage; the possibility of breakage of the carbide trough, etc.

Ajax-Wyatt Induction Furnace

The Ajax-Wyatt induction furnace (known also as the Bridgeport Brass furnace) was developed during the war, largely for the casting of cartridge case slabs of yellow brass. It is manufactured by the Ajax Metal Co., Philadelphia, the 60-cycle furnace in 80-kw. size having a hearth capacity of 1500 lb. Circular in shape, the furnace has a refractory lining that has been preformed and burned. This lining is made in a special shape and fits into the shell of the furnace. When the lining is to be renewed the old one is taken out and a new one fitted in place. The operation is comparable to fitting a new crucible into a crucible type combustion furnace.

The circular chamber of the furnace contains the molten bath in one mass; immediately under the bath is the yoke of a single-phase transformer, the secondary of which is a thin shell of metal being melted, constituting one turn around the transformer yoke. A large volume of current at a very low voltage is induced in the secondary or thin shell of metal at the bottom of the bath. The passage of this large current generates heat within the metal itself, which is in turn transmitted to the bath above. The magnetic forces within the transformer set up a rotor effect of circulation of the metal, which is constant as long as the current is flowing. This circulation, inherent in the induction furnace, is not peculiar to this or any other type of induction furnace. The direction and intensity of the circulation are governed to some

extent by the nature of the magnetic field set up by the transformer and also by the arrangement of the transformer.

As mentioned above, the heat is generated at the bottom of the furnace at the bottom of the bath and carried to the bath by circulation. As the bath is in a mass and not in the form of a ring, as in the typical steel-melting furnace of this type, there is no "pinch effect" that was so troublesome in this type of furnace. The current flows around the secondary in the vertical plane, instead of in the horizontal plane as in the steel-melting furnace. The temperature is controlled by varying the voltage and the electrical input to the primary of the transformer. The furnace is either nose or trunnion tilted; the nose-tilted furnace is motor-operated while the trunnion-tilted furnace may be either hand or motor-operated.

With a hearth capacity of 1500 lb., the furnace has a melting capacity of about 500 lb. per hr. The current consumption is 200 kwhr. per ton and the metal loss under 1 per cent. It is single phase and has a transformer capacity of 80 kw. No figures are available as to the power factor, but in all probability it is not better than 75 per cent.

Hot metal from some external source must be charged into the furnace to prime it; when the heat is melted, only a portion is poured, perhaps less than half of it. Cold metal to this same amount is then charged into the remaining bath and melted, when the operation is repeated. During the night the unpoured portion of the last heat must be left in the furnace and the current left on, to keep it in a molten state. If the last heat is poured entirely, hot metal from an external source must be charged in the morning, as there must be hot metal to form a secondary before heat can be generated.

Some of the advantages claimed for this type of furnace are that the heat is generated within the metal itself; control of the temperature and manipulations; low power cost and metal loss; constant circulation of the metal, insuring thorough mixing; absence of contamination from gases, etc.

Some of the disadvantages are necessity for priming the furnace with hot metal from an external source, which limits its flexibility in foundry practice; special nature of the electrical application; cooling of the furnace primary coil; circulating currents in the melting of certain grades of metal, etc.

Repulsion Induction Furnace

The General Electric Co. repulsion induction furnace is a recent development just announced. It is built in one capacity only, arranged for nose or trunnion tilting. The furnace has a hearth capacity of 1200 lb. and a melting rate of 750 lb. per hr. It follows the same principles as the Ajax-Wyatt and is to some extent similar in construction, but differs somewhat in the manner of applying the transformer yoke to the furnace. It is arranged with a refractory lining of special shapes which have been preformed and burned, and are fitted into the furnace as in the preceding case.

The circular chamber contains the bath in one mass. Immediately under the bath, and communicating with the circular chamber by two ports, is a thin cylinder of molten metal surrounding the primary of the transformer and forming the secondary. This secondary, as in the preceding case, forms one turn in which a large volume of current at a very low voltage is induced. The passage of the current through the metal of the secondary generates heat within it, which in turn is communicated to the bath above through the two ports located at the ends of the cylinder forming the secondary.

Differences Between Two Induction Furnaces

One of the chief differences between the two types of induction furnaces lies in the manner in which the metal forming the secondary circulates through and communicates the heat to the bath. In the General Electric furnace it passes up through a port at one end of the cylinder, thence through the bath and down

through the other port at the other end of the cylinder. In the Ajax-Wyatt furnace the bottom of the bath forms a sector of the secondary turn and the circulation is a churning action. In the General Electric furnace the isolation from the bath, of the metal forming the secondary is more complete than in the other type.

With the ports under the bath located as they are, and by reason of the primary coil arrangement, the circulation is longitudinal along the coils and unidirectional. Another chief difference in the two types is the ability to control the degree of circulation or agitation of the bath metal by shifting the position of the primary coil on the transformer leg, thereby varying the field. This is patented.

As in the preceding case, hot metal must be charged from an external source to prime the furnace. In melting practice, only a portion of the metal is poured each heat. In this case a little less than half is left in the furnace, into which the cold stock is charged and, when melted, the process is repeated. During the night current must be kept on to hold the unpoured portion of the last heat molten, or hot metal charged into the furnace in the morning.

The furnace has a transformer rating of 75 kw., is single phase, operates at 68 to 75 per cent power factor, has a melting rate of 750 lb. per hr. and a hearth capacity of 1200 lb. The current consumption is 200 kwhr. per ton for yellow brass (60/40) and 230 kwhr. per ton for red brass (80/20). The metal loss melting yellow brass in one per cent and for red brass 0.5 per cent. From the above it would seem that this furnace is more rapid in its action than the preceding, and with economies about the same. Low-pressure air from an external source or a motor-driven blower auxiliary is required for cooling the primary coil of the transformer.

The advantages and disadvantages of this furnace are about the same as those in the preceding case, except that the rapidity of melting is somewhat higher.

Where the Induction Furnace Excels

Theoretically the induction is the ideal electro-thermic unit. All the heat is generated directly within the bath itself, none of it being reflected or carried to the bath by any external medium. This is diametrically opposite to all other methods of melting. There is no electrode consumption, water cooling or electrode auxiliary equipment losses, as in the arc furnaces. Induction furnaces can be constructed more compactly than other types of the same capacity, and so on. In melting steel in the induction furnace two or three serious disadvantages presented themselves which practically have disqualified the use of this type of furnace for this use.

One serious disadvantage was the inability to burn in a hearth or lining at a temperature higher than that of the bath. Another serious drawback was the disturbance to the power supply and the splashing and surging of the steel in the narrow channel forming the bath, caused by the "pinch effect" inherent in the furnace. Another drawback was the necessity of charging hot metal to prime the furnace.

In the two types of induction furnaces just described, the first of these disadvantages has been taken care of by inserting a preformed and burned lining into the furnace. The second disadvantage is reduced to a minimum, if it exists at all, since the "pinch effect" is reduced by the weight of the bath. The third disadvantage remains, however, and until it is eliminated the flexibility of this type of furnace and its field of application to the average foundry will be seriously hampered. The induction furnace has not proved satisfactory in the commercial melting of aluminum, which is a very tricky metal in the matter of pouring temperatures.

Resistance Furnace Excels with Dirty Charge

As the resistance furnace inherently is sluggish in its action, no rapid changes in temperature take place in the furnace, which thus forms a thermal fly-

wheel effect in routine operation. However, the resistance furnace approaches nearest to the electrification of the combustion melting processes, with the elimination of a great number of the attending disadvantages, trials and troubles of combustion practice. Anything that can be melted in the average combustion practice can be melted better and cheaper in the resistance furnace. It adapts itself more than any other type to local shop conditions and its flexibility is such that it can be made to suit the average foundry conditions. It permits any degree of mechanical working of the bath, settling out of dirt and slag and allows a variation of manipulation of copper-nickel alloys carrying zinc.

The neutrality of the atmosphere and the control of the temperature in both the induction and resistance furnaces make possible the holding of part or all of the unpoured metal for a long period, without disturbing in any way the composition of the metal. This is a highly valuable feature, lending itself greatly to the local conditions existing at any time in the production schedule or other shop conditions.

It cannot be denied that the furnace, when installed, becomes a shop operating unit, and will receive only that care, attention and treatment which the operating man gives it. To be a commercial success the furnace must suit the operating department; it must be adaptable to the particular foundry practice where it is to operate; it must be sufficiently flexible in operation of being built around and worked into local shop practice and methods, and still be sufficiently positive in its action to produce more and better metal and cheaper at the pouring floor than in the combustion practice.

Deciding Factors as to Choice

The deciding factors or advantages in the use of one type of electric furnace over the other would be the net sum of the various advantages neutralized by the disadvantages, the economies in kwhr. per ton being an important factor, but not the most important. The deciding factors would be the uniformity of the castings produced; the ability to use low grade scraps without undue loss; the ability to melt any grade of metal under special process or procedure in local conditions with any degree of manipulation of the bath by rabbling, skimming, mixing, etc.; by placing the melting in the hands of the superintendent or metallurgist and taking it out of the hands of the melter, thus permitting the use of cruder labor and so on. The circulation of the metal, as in the induction furnace, is an advantage when the alloy is made up of new, clean metal; on the other hand, this is very undesirable in melting dirty borings and small scrap, which is the case in a large portion of melting in jobbing foundries.

There are two distinct fields of application in the two principles of electric furnace melting into which the two types fit. In mills and foundries producing large tonnages of uniform composition, the induction furnace finds its best application, since it is rapid in its action, and probably the lowest in current consumption per ton of metal melted of any of the types in use. It is claimed for the Ajax-Wyatt furnace that it melts 95 per cent of all brass melted electrically, over 50 per cent of all that melted in the brass rolling industry and more than that of all other types of electric furnaces combined. No special claims are made for the foundry industry.

In the average foundry, where different alloys are melted and where the product consists of small and thin-webbed castings, where intermittent operation may be required, where the heat may be made up of different grades of metal, including wash metal and borings that are dirty, etc., the resistance furnace finds its best application.

High Cost a Deterrent

One main obstacle to the application of the electric furnace to the foundry industry lies in its first cost. If a melting unit can be produced in small capacity, which will operate efficiently, and which can

be sold for \$1,000 or \$1,500, then electrified melting will receive its greatest impetus. It is the same as in the automobile industry: The greatest business in its history came when the "automobile" was reduced in price so that the every-day citizen could purchase

one. It is no longer a luxury as in the past. That is what has been and is still the chief trouble with the electric furnace in the brass foundry. While being a necessity in fact, it is still a luxury to the average plant.

PERCENTAGE OF MANUFACTURE

Census Bureau Shows Average Operation of 56.8 Per Cent of Capacity in 1921—Iron and Steel Much Lower

WASHINGTON, Oct. 23.—Final figures of the Bureau of Census for 1921 presenting statistics of output of manufactures, possible output and the actual output compared with the possible output have just been completed and will be published soon. The report shows that 134 blast furnaces, whose products were valued at \$419,771,244, operated at 40.1 per cent of possible capacity and that the value of the products, had these furnaces operated at total capacity, would have been

\$1,045,535,678. Only a slightly better showing was made in this year of depression in 494 steel works and rolling mills. The value of the products of these works was \$1,481,659,352, representing 43.3 per cent of possible capacity, while the value of the products on a basis of total capacity is placed at \$3,425,271,113.

Figures of interest to the iron and steel and related industries, carried in the report, are given.

The statistical study of 353 industries represented reports from 194,194 establishments reporting operations in 1921. The total actual output of these manufacturers amounted to \$42,318,241,453, while the estimated possible output would have aggregated \$74,123,930,736, making the actual production 56.8 per cent of the possible output.

	Number of Establishments	Value of Products	Possible Output	Per Cent of Possible Output
Iron and Steel:—				
Blast furnace plants.....	134	\$419,771,244	\$1,045,535,678	40.1
Steel works and rolling mills.....	494	1,481,659,352	3,425,271,113	43.3
Bolts, nuts, washers and rivets*.....	125	357,734,454	966,630,683	37.0
Cast iron pipe.....	70	44,321,548	84,610,229	52.4
Steel doors and shutters.....	45	12,466,701	20,044,867	62.2
Iron and steel forgings*.....	240	83,151,126	216,552,400	38.4
Iron and steel nails and spikes, etc.*.....	56	10,976,307	16,951,795	64.8
Wire.....	61	99,945,614	174,929,486	57.1
Wirework not elsewhere specified.....	413	66,384,507	128,768,368	51.6
Steel barrels, drums and tanks.....	31	14,525,010	33,126,246	43.8
Structural work*.....	1,021	250,085,446	602,471,582	41.5
Iron and steel, processed or welded.....	320	6,202,156	11,154,553	55.6
Iron and steel wrought pipe.....	57	56,662,278	119,205,491	47.5
Horseshoes*.....	12	1,931,812	2,802,210	68.9
Total of group.....	3,079	2,905,817,000	6,848,045,000	42.4
Machinery:—				
Machine tools.....	348	67,729,362	291,773,840	23.2
Electrical machinery, apparatus and supplies.....	1,333	838,985,443	1,469,398,706	56.8
Cash registers and calculating machines.....	49	53,652,942	83,773,206	64
Engines and water wheels.....	296	199,498,575	630,603,513	31.6
Foundry and machine shop products.....	9,013	1,565,526,944	3,506,842,559	44.6
Foundry supplies.....	50	4,965,678	17,276,179	28.7
Gas machines and gas and water meters.....	65	21,956,424	34,363,178	63.9
Pumps, steam and other power.....	135	47,239,001	87,116,394	54.2
Pumps, not power.....	86	22,723,412	39,543,515	57.5
Agricultural implements.....	353	163,816,679	462,386,925	35.4
Sewing machines, cases and attachments.....	36	35,608,297	71,447,233	49.8
Stoves and hot air furnaces.....	357	101,572,793	214,838,574	47.3
Total of group.....	12,121	3,118,275,000	6,909,365,000	45.1
Vehicles:—				
Shipbuilding, steel.....	126	356,214,854	749,609,001	47.5
Springs, steel, vehicles, heavy machines in steel works or rolling mills.....	126	31,750,373	73,461,571	43.2
Cars and general shop construction and repairs by steam railroad companies.....	1,766	1,180,030,133	1,608,708,792	73.4
Cars and general shop construction and repairs by electric railroad companies.....	560	87,312,426	99,719,090	87.6
Cars, electric railroad, not including operations of railroad companies.....	10	14,856,068	40,165,004	37
Cars, steam railroad, not including operations of railroad companies.....	108	325,680,157	753,011,576	43.3
Locomotives not made by railroad companies.....	22	102,023,358	291,575,891	35
Motor vehicles.....	385	1,671,386,976	3,875,762,348	43.1
Motor vehicle bodies and parts.....	1,974	408,016,532	954,000,249	42.8
Motorcycles, bicycles and parts.....	46	23,091,749	67,053,905	34.4
Total of group.....	5,123	4,200,362,000	8,513,068,000	49.3
Hardware and Tools:—				
Hardware.....	430	116,688,661	221,140,053	52.8
Steam fittings and steam and hot water heating apparatus.....	274	127,366,887	237,856,529	53.5
Files.....	39	7,647,252	20,831,273	36.7
Saws.....	79	18,185,297	46,850,114	38.8
Scales and balances.....	65	15,884,770	29,111,826	54.6
Screws, machine.....	160	18,365,242	52,830,624	34.8
Needles, pins, hooks and eyes.....	68	18,896,168	30,602,095	61.7
Total of group.....	1,115	323,034,000	639,223,000	50.5
Non-ferrous:—				
Brass, bronze, copper and allied products.....	911	214,903,735	466,817,539	46
Copper, tin and sheet iron work.....	3,105	148,776,164	278,522,054	53.4
Smelting and refining copper.....	28	234,895,245	566,356,023	41.5
Lead, bar, pipe and sheet.....	29	10,473,575	18,233,143	57.4
Smelting and refining lead.....	23	150,593,779	214,590,544	70.2
Smelting and refining zinc.....	29	37,482,675	101,537,189	36.9
Smelting and refining metals not elsewhere specified.....	5	7,060,205	43,079,109	16.4
Smelting and refining, not from the ore.....	60	15,150,055	39,123,111	38.7
Aluminum manufacture.....	87	45,822,161	97,846,627	46.8
Total of group.....	4,277	865,158,000	1,826,106,000	47.4
Miscellaneous:—				
Coke, not including gas house.....	176	221,313,363	473,855,900	46.7
Crucibles.....	17	1,969,930	15,474,048	12.7
Galvanizing.....	51	4,017,820	8,185,662	49.1
Enameling.....	43	2,022,927	4,798,680	42.2
Total of group.....	287	229,324,000	502,315,000	45.7
Total, six groups.....	26,002	11,641,970,000	25,238,122,000	46.1

*Not made in steel works or rolling mills.

Rehearing of Assigned Car Case Concluded at Washington

WASHINGTON, Nov. 9.—After lasting 10 days, the rehearing before the Interstate Commerce Commission of the assigned car case was concluded last Thursday. Briefs are to be filed by Dec. 1, and while no date for arguments has been set, it has been tentatively suggested that they be made on Dec. 17-19, inclusive. This arrangement will cause a postponement of the effective date of the order entered in the case which was fixed for Dec. 1 after being postponed from the original and earlier date. In the event the order is not modified, the railroads and industrial interests, including iron and steel manufacturers, have considered the idea of taking the proceeding before the Supreme Court. There are those, however, who doubt that it can be made a court case. They take the view that it is purely an administrative matter resting solely with the commission.

Opposition to the assigned car was expressed strongly by a number of witnesses. Among them was Van A. Bitner, representing the United Mine Workers of America. It was his contention that if all kinds of assigned cars are eliminated it will be but a short time until uneconomical mines will be driven out of business. The result would be to operate only economical mines, he said, equally divide transportation, stabilize industry and give uniform and steady employment to miners.

Speaking for the National Coal Association, its traffic manager, John D. Battle, said there are two phases to the assigned car situation, one dealing with the railroads and the other with cars owned by industries.

Sympathy for Bonar Law's Family

After obtaining the authorization of leading pig iron makers and steel manufacturers whose offices are located in New York, Gueret, Jacks & Partners, Inc., New York, last week dispatched a cable to H. Arnold Wilson, a director of William Jacks & Co., Ltd., Glasgow, asking him to convey to the bereaved family of the Hon. Bonar Law the heartfelt sympathy and condolence of the pig iron and steel manufacturers of the United States. Bonar Law had been identified many years with the iron and steel industry of Great Britain. Mr. Wilson was asked to convey the message because he was not only a close business associate of Mr. Law for a great many years, but also one of his warmest personal friends.

New Control of Bock Bearing Co.

CLEVELAND, Nov. 5.—At a meeting of the Bock Bearing Co., Toledo, Ohio, held Oct. 31 in Cleveland, a new directorate was elected, vesting the control of the company in the hands of the preferred stockholders.

W. E. Bock, founder and first president and general manager of the Bock Bearing Co., was elected president, and R. B. Wallace, vice-president. The other directors are: Maynard H. Murch, Frank A. Scott and A. V. Cannon. R. E. Clingan remains as general manager, and C. J. Steinbicker, former treasurer, now becomes secretary and treasurer.

No changes are contemplated in the active organization, but the management feels that under the new arrangement the company will have much better prospects for expanding. For the past six years the company has been controlled by the Standard Parts Co., Cleveland, through ownership of the common stock.

Johansson Gages Available to Users

Official announcement has been made by the Ford Motor Co., Detroit, of the acquisition of C. E. Johansson, Inc., Poughkeepsie, N. Y., the American company engaged in the manufacture and sale of the well-known Johansson gage blocks and measuring tools. The purchase, which was reported in THE IRON AGE of Oct. 18,

also includes the sole American rights to the gages and the methods by which they are made.

The Johansson gage blocks and other instruments will continue to be manufactured for the trade. It is the feeling of the Ford company that since these measuring instruments are a recognized standard of measurement and precision and of such value to manufacturers and the general public, they should be available to all who desire to purchase them.

Mr. Johansson, inventor of the gages, becomes a factory executive in the Ford organization. He arrived from Eskilstuna, Sweden, Oct. 23, and has begun his work at the Ford engineering laboratory at Dearborn.

Amalgamates with Babcock & Wilcox Companies

TORONTO, Nov. 5.—R. O. McCulloch announces a deal whereby the Goldie & McCulloch Co., Ltd., Galt, Ont., amalgamates with Babcock & Wilcox, Ltd. of London, England and the Babcock & Wilcox Co. of New York, in a new Canadian company to be known as Babcock, Wilcox, Goldie, McCulloch Co., Ltd. The new concern has secured a charter with a capital stock of \$3,000,000, and according to official announcement is now operating under direct management of R. O. McCulloch and A. R. Goldie. The new company takes over all of the local business, except the safe works, the latter to be operated separately by a different company to be known for the present as Goldie & McCulloch, and will continue manufacturing operations in its present quarters, although it is pointed out that a new plant will be erected in Galt for this undertaking in the not distant future.

John F. Dailey, who purchased the former gun plant of the Symington-Anderson Corporation at University Avenue, Rochester, N. Y., has sold it to Louis Gibaud of the Louis Gibaud Motors, 255 East Avenue, that city. Mr. Dailey purchased the property several weeks ago from the United States Government and the Todd Protectograph Co. for \$300,000. It was sold to Mr. Gibaud for \$1,000,000. The Davis Machine Tool Co., St. Paul Street, Rochester, was purchased at sheriff's sale two weeks ago by Mr. Gibaud.

The steel group of the Buffalo Athletic Club on Tuesday evening, Oct. 30 tendered a farewell dinner to Clinton S. Bradley, former resident manager of the Buffalo office of the Jones & Laughlin Steel Corporation. Eugene J. McCarthy, president of Beals, McCarthy & Rogers, presided. A set of studs of platinum and gold was presented. Mr. Bradley took up his duties Nov. 2 as manager of sales of the hot rolled department with headquarters at Pittsburgh.

COMING MEETINGS

November

Electric Power Club. Nov. 19, 20, 21 and 22. Fall meeting at French Lick Springs Hotel, French Lick, Ind. S. N. Clarkson, Rockefeller Building, Cleveland, secretary.

December

American Society of Mechanical Engineers. Dec. 3, 4, 5 and 6. Annual meeting in New York. Calvin W. Rice, 29 West Thirty-ninth Street, New York, secretary.

National Exposition of Power and Mechanical Engineering. Dec. 3 to 8, inclusive. Second annual exposition, Grand Central Palace, New York. Headquarters, Grand Central Palace, New York.

American Institute of Chemical Engineers. Dec. 5, 6, 7 and 8. Winter meeting in Washington. D. C. J. C. Olsen, Polytechnic Institute, Brooklyn, N. Y., secretary.

Trade Changes

The Cadmus Machinery Co. has been appointed exclusive sales agent for the Grand Rapids grinding machine division of the Galmeyer & Livingston Co., Grand Rapids, Mich., to cover the Detroit territory.

The Gas Producer & Engineering Corporation of New Jersey has changed its address from 115 Broad Street to 30 Church Street, New York.

The Landis Tool Co. has purchased all patents, patterns, jigs, etc., of the Oakley cutter and reamer grinder, manufactured by the Oakley Machine Tool Co., Cincinnati. This machine will be manufactured by the Landis company and will be known as the Landis cutter and reamer grinder, with sizes corresponding to the No. 1, 2 and 3 Oakley machines.

The Blaw-Knox Co., Pittsburgh, has opened a Buffalo office at 622 Genesee Building. J. C. McQuide has been transferred from the Pittsburgh organization to manage the Buffalo office, which now will serve Northern and Western New York and adjacent territory.

The Reeves Brothers Co., Alliance, Ohio, makers of steel tanks and oil refinery equipment, cement and mining machinery and crossting plants, has opened an office at 2012 L. C. Smith Building, Seattle, Wash., from which all western business will be handled. Percy E. Wright, consulting mechanical engineer, has been appointed assistant sales manager of the company and will be in charge of the office.

The Alliance Steel Corporation, 332 South Michigan Avenue, Chicago, announces the opening of a new bar mill.

The Rockford Steel Equipment Co., Rockford, Ill., has changed its name to the Rockford Steel Furniture Co.

The Southern California Iron & Steel Co. has moved offices to Slauson Avenue, Huntington Park. The new address is Box 257, Huntington Park, Cal.

The Morrison & Risman Co., Buffalo, announces the opening of an office in Cleveland at 808 Ulmer Building.

H. W. Gledhill, eastern sales manager Shepard Electric Crane & Hoist Co., 30 Church Street, New York, has opened offices in the City Center Building, 121 North Broad Street, Philadelphia. G. M. Rumsey is connected with the office as assistant sales representative. The New York office will be managed by A. J. Barnes, who will be also in charge of export sales and advertising. H. A. Baugh will have charge of the Pittsburgh office, D. B. Patterson of the Baltimore office, W. B. Briggs of the Chicago office, W. H. Ringe of the San Francisco office, and F. R. Quigley of the Birmingham office.

All interest of the Oakley Machine Tool Co. in Oakley universal tool room grinders has been sold to the Landis Tool Co., Waynesboro, Pa.

The Grant Iron & Metal Co., Buffalo Boulevard and Doramus Street, Detroit, has taken over the Grant-Holub Co., Canton, Ohio, and will operate that plant as a branch of the Grant Iron & Metal Co. All debts will be paid by the Grant Iron company as soon as books have been audited. Harry S. Grant, president of the purchasing company, is also president of the Grant-Holub Co., which is being dissolved.

The F. C. Richmond Machinery Co., Salt Lake City, Utah, representative for the Conveyors Corporation of America, Chicago, has moved offices and salesrooms to 320 West Second South Street, that city.

The Cochise Machine Co., manufacturer of hammer and piston drills, Los Angeles, Cal., has changed its name to the Cochise Rock Drill Mfg. Co.

The Gwilliam Co. has moved its New York equipment from 253 West Fifty-eighth Street, to the Brooklyn headquarters, 23 Flatbush Avenue.

The Chicago Pneumatic Tool Co. has taken over the exclusive sale of the Crescent Pump Co., 743 Beaubien Street, Detroit, and hereafter will handle all inquiries regarding the latter.

President John Kelsey of the Kelsey Wheel Co. has confirmed the sale of a portion of Kelsey interests at Memphis, Tenn., to the Fisher Body Corporation, including 45 acres of land, a double-band sawmill, dry kilns, and an automobile body woodworking plant. The property will be adapted to the new requirements as soon as possible.

The Hendee Mfg. Co., Springfield, Mass., motor cycles, has changed its name to the Indian Motorcycle Co.

The Gulf States Steel Co. reports net income for the third quarter of 1923 of \$336,747, after taxes and charges. This is equivalent after deduction for preferred dividends to \$2.68 per share on common stock. In the preceding period net income reached \$439,928 and in the third quarter of 1922 \$252,284.

Plans of New Companies

The Bates-Roebling Patents Co., 50 Church Street, Room 1179, New York, has been incorporated with capital stock of \$200,000 to manufacture typewriters and parts. About 15 patents have been purchased and will be incorporated in one small portable machine, which will be sold at a low price. Although the company may eventually manufacture in its own factory, it will likely have parts manufactured by contract for the present and operate an assembling plant. The incorporators are G. W. Roebling, H. Bates, and I. F. Moritz.

The Triamant Corporation, New York, incorporated with 1000 shares of stock, no par value, will manufacture iron and steel products, particularly a tungsten alloy. The incorporators are F. P. Fremont and E. Lessel. Address is in care of L. C. Burdett, 233 Broadway, New York.

The Ross Propeller Corporation, New York, has been incorporated with capital stock of 12,000 shares, no par value, to manufacture propellers and kindred products. The company will concentrate on propellers to be used in motor boats and launches. Operations, when started, will be on a small scale. Incorporators are R. M. Shields, L. Goddard and M. Bauman. J. Wilbur Ross, Brooklyn, heads the company. Address in care of O. S. Carrol, 40 Wall Street, New York.

Mayburner, Inc., 8 Hicks Place, Flushing, L. I., has been incorporated with capital stock of \$50,000 to manufacture oil-burning equipment and devices. It is in the primary stages of organization. Incorporators are L. May, R. R. Zeamans and H. Sancier.

M. D. Goodman, who was associated for 10 years with the Electric Controller & Mfg. Co. and who recently was connected with Stephen, Hall & Co., has established a business at 185 Bigelow Street, Newark, N. J., and will act as dealer in used electrical equipment.

The Oakley Valve Co. of Connecticut, 159 Coram Avenue, Shelton, Conn., recently incorporated with capital of 500 shares of stock to manufacture valves, is now in production at its factory in Shelton. It has equipment for present needs. L. W. Holmes is one of the principals.

The Nojar Mfg. Co., Inc., 1755 Broadway, New York, recently organized to manufacture automobile equipment, is now producing a special type of shock absorber.

The American Machine & Mfg. Co., 441 Folsom Street, San Francisco, recently incorporated with capital stock of \$250,000, has taken over the business of a partnership manufacturing special machinery. Manufacturing will be continued along the same lines as before. The company purposes to enlarge its plant. M. Renstein is secretary.

The Randle Radio Co., 1723 Powers Street, Cincinnati, has been organized with capital stock of \$100,000 for the manufacture of radio equipment. Actual production will be started within the next two weeks. The officers of the company are identified with the Randle Machinery Co., Cincinnati, manufacturer of power plant machinery and tools. W. E. Randle, Jr., is secretary-treasurer.

A. W. Erickson, who recently resigned as superintendent of the Wapakoneta Machine Co., Wapakoneta, Ohio, has established the Pioneer High Speed Machine Knife & Tool Co. at Cleveland. The company is now in production concentrating on cutting tools. Mr. Erickson has had thirty-one years' experience in this field and has brought with him as heads of departments, men with whom he has been associated for many years.

C. R. Bryant, formerly proprietor of the Bryant Garage, Jefferson City, Mo., will soon open a machine shop for the manufacture of tools which he has lately patented, under the firm name of the Jefferson City Machine & Tool Co.

The Lake Shore Steel & Machinery Co., 168 North Michigan Avenue, Chicago, recently incorporated with \$10,000 capital stock, is a jobbing organization dealing in cold-rolled steel, machinery, twist drills, reamers, hack saw blades, files, and high speed and carbon tool steel. Surplus stocks of these materials are kept for quick delivery. Officers are J. Ross MacDonald, president and treasurer, and Arthur Johnson, secretary.

The Colorado Fuel & Iron Co. report for the quarter ended Sept. 30 shows a deficit of \$356,344, after deducting interest charges, taxes, preferred dividends, etc., as compared with a balance for common of \$458,057 in the preceding quarter and a deficit of \$171,462 in the September quarter of 1922. For the nine months ending with Sept. 30, last, there was a balance available for common dividends of \$564,126, against a deficit of \$581,161 in the corresponding period last year and a deficit of \$579,092 over that period of 1921.

Machinery Markets and News of the Works

MORE HOPEFUL FEELING

Buying by Railroads Expected During Remainder of Year

New York Central and Other Railroad Lists and Industrial Inquiry Looked for at Early Date

Although the October rate of bookings has been scarcely maintained, prospective business seems encouraging and the tone of the market is generally optimistic.

The New York Central Railroad is reported to be preparing to put out an inquiry soon for about 25 machines. The Delaware, Lackawanna & Western is also said to be working on a list. Action is expected shortly on a list issued some time ago by the Lehigh Valley. Single machines on lists of the Baltimore & Ohio and the Rock Island railroads are being figured on. The Central of Georgia has issued an inquiry for a half dozen machines, said to be for estimating purposes.

It is reported in New York that a large automobile parts manufacturer has been doing experimental work

preparatory to a complete renewal of its machine-tool equipment and that a large list may be issued before long. A southern Illinois buyer is inquiring for \$35,000 to \$40,000 worth of equipment and a Chicago plant wants about \$50,000 worth of tools.

Action is expected to be taken on the inquiry for 100 lathes for Japanese shipment. Chicago steel interests are about to close for a number of heavy special-purpose machines.

The Burlington has distributed a number of formal orders against its list, having placed 25 lathes, six shapers and a number of miscellaneous tools.

The Ford Motor Co., Detroit, has placed an order in Cleveland for 60 automatic screw machines and an inquiry is pending for 70 automatics from an Eastern automobile parts maker.

The United Ejector Co., Boston, purchased 60 large turret lathes from a Cleveland manufacturer and the Pacific Mills, Boston, closed on about \$50,000 worth of machine shop equipment for a Southern subsidiary. The Westinghouse Electric & Mfg. Co., East Pittsburgh, is reported to have purchased 15 lathes.

New York

NEW YORK, Nov. 5.

WHILE orders for machine tools have not increased, and in fact are at almost the lowest point of the year, prospective business is encouraging. Most of the large Eastern railroads are expected to come into the market between now and the end of the year. The New York Central is preparing to put out an inquiry shortly for about 25 machines, the Delaware, Lackawanna & Western is also said to be working on a list, and action is expected shortly on a list issued some time ago by the Lehigh Valley, which has been held up awaiting the necessary appropriation. The Central of Georgia has issued an inquiry for a half dozen machines, said to be for estimating purposes, but this type of inquiry is usually the forerunner of purchases. A large automobile parts manufacturer has been doing considerable experimental work preparatory to a complete renewal of its machine-tool equipment. A large list may be issued by this company before long. The Toledo, St. Louis & Western Railroad has bought a 400-ton wheel press. The Ingersoll-Rand Co., New York, bought two 6-ft. radial drills. The Crasler-Canfield Midway Oil Co. of California has bought a 1500-lb. and a 3400-lb. steam hammer.

The municipal council, Bloemfontein, South Africa, is planning for the construction of a city-owned electric power plant to cost more than \$250,000 with machinery, for which bids will be asked in the near future. The American Consulate office, Johannesburg, S. A., is in touch with the project.

Bids will be taken immediately by the International Harvester Co., 960 Broadway, Albany, N. Y., for a two-story automobile service and repair building, 50 x 210 ft., estimated to cost \$100,000. Headquarters of the company are at 606 South Michigan Avenue, Chicago.

The New York Edison Co., 130 East Fifteenth Street, New York, will commence the erection of a one-story power station, 41 x 100 ft., at 27 West Forty-seventh Street, to cost about \$95,000 with equipment. William Whitehill, 709 Sixth Avenue, is architect. The company has also purchased property at 268-70 Canal Street, 53 x 102 ft.

The Auto Table Co., Inc., 120th Street and Jamaica Avenue, Richmond Hill, N. Y., is in the market for a combined punch, shear and angle cutter for handling iron up to ½-in. thick; also for an 8-ft. press, second-hand, in good condition.

A. E. and C. A. Millington, Denver, Colo., engineers, have been engaged by a company being organized to prepare plans for the construction of a paper mill on site near Ketchikan, Alaska, with initial capacity of 120 tons of newsprint per day. The project will include a hydroelectric power plant in the vicinity of Orchard Lake, with output of about 10,000 hp. The new plant is estimated to cost \$750,000 with machinery.

The New York Machinery Co., 200 Fifth Avenue, New York, is inquiring for a pipe cutting and threading machine.

The C. Spiro Mfg. Co., 68 East 131st Street, New York, manufacturer of automobile equipment and accessories, has purchased a five-story factory at Main and Chestnut Streets, Dobbs Ferry, N. Y., 50 x 120 ft., for \$75,000, and will remodel it for a new plant.

Jacob Marks, 116 North Main Street, Portchester, N. Y., has plans for a two-story automobile service and repair building, 50 x 135 ft., to cost \$46,000, including machine shop and other equipment. W. Stanley Wetmore, 1 North Main Street, is architect.

The International Paper Co., 100 East Forty-second Street, New York, will soon commence the construction of a hydroelectric generating plant at High Falls, N. Y., on the Saranac River, to cost \$600,000 with power dam and machinery.

The City Council, Guayaquil, Ecuador, has plans under way for a municipal electric light and power plant, and will take bids in the near future. The American Consulate office, Guayaquil, has details.

Baskin Brothers, 185 Sixth Avenue, New York, manufacturing jewelers, have leased space in the new building at 27-37 West Sixtieth Street, for a new plant and will remove to this location. A floor in the building has also been leased to Katz & Ogush, 141 West Thirty-sixth Street, who will remove and expand their jewelry manufacturing plant at the new location.

The American Spectacle Co., 136 West Fifty-second Street, New York, is considering the installation of a cutting machine, power-operated.

In connection with the acquisition of the Canadian General Electric Co., Toronto and Peterboro, Ont., and its subsidiary, the Canadian Allis-Chalmers Co., Toronto, Montreal and other locations, the General Electric Co., Schenectady, N. Y., purposes to expend close to \$5,000,000 for enlargements in the different plants for approximate doubling of present capacity, including the converting of the Allis-Chalmers works for other branches of electric machinery production.

Leo F. Robertson, Inc., 540 West Twenty-second Street, New York, operating a general machine works, is planning for the installation of an air compressor.

The Crane Market

Few new inquiries for either electric overhead traveling or locomotive cranes are reported, but the market continues fairly active with old inquiries. The expected list from the Western Electric Co., calling for several overhead cranes for the New Jersey plant, has not yet materialized. The General Electric Co., Schenectady, N. Y., in addition to the 14 cranes for Philadelphia, is said to be receiving bids on a 15-ton, 58-ft. span overhead crane for Pittsfield, Mass. James Stewart & Co., 30 Church Street, New York, have been receiving quotations on two 7½-ton bucket handling cranes for installation in Ohio. Although few new inquiries for locomotive cranes are noted, sellers report good business in prospect, but not yet in the form of actual inquiry. Among prospective export inquiries is the intention of the Port Trust, Madras, India, to call for bids on four 3-ton electric traveling cranes for port service. Tenders will be sent to sellers in India and England and American builders represented in either country may participate. The Helm Cut Stone Co., 578 Locust Street, Appleton, Wis., is asking for a 5-ton and 2-ton hand power cranes and two jib cranes. The National Plate Glass Co., Detroit, subsidiary of the General Motors Corporation is receiving bids on cranes for its new plant at Blairsville, Pa. The Columbiana Foundry Co., McKeesport, Pa., is in the market for a 5-ton crane, either new or used. The Carnegie Steel Co., Pittsburgh, is receiving bids on a 5-ton

crane for the McCutcheon works and a 10-ton crane for the Duquesne works. The Carnegie Steel Co. is also receiving estimates on five cranes, presumably for the Ojibway works of the United States Steel Corporation.

Among recent purchases are:

Pennsylvania Railroad, Eastern Region, Philadelphia, a 5-ton, 43-ft span overhead traveling crane from the Case Crane & Engineering Co., Columbus, Ohio.

American Smelting & Refining Co., New York, a 30-ton, 45-ft. span electric crane for San Luis Potosi, Mexico, and a 7½-ton, 65 ft. span, grab bucket crane for Rosita, Mexico, from the Shaw Electric Crane Co.

H. R. Goeller Iron Works, Hillside, N. J., a 2-ton, 27-ft. span, underhung, hand power crane from the Chisholm-Moore Mfg. Co.

Alpena Power Co., Alpena, Mich., a 30-ton, 1-motor overhead travelling crane from the Whiting Corporation.

Aeromotor Co., Chicago, a 5-ton electric traveling crane from the Shaw Electric Crane Co.

Eastwick Engineering Co., 342 Madison Avenue, an 8-ton, 51-ft. 2-in. span, 3-motor overhead traveling crane for the Texas Sugar Refining Co., Texas City, Tex., from the Chesapeake Iron Works.

South Manchuria Railway Co., Dairen, Manchuria, a 200-ton locomotive hoist, purchased direct, from the Whiting Corporation.

The Goodyear Tire & Rubber Co., 123 West Sixty-fourth Street, New York, with headquarters at Akron, Ohio, has secured the patent rights to manufacture Zeppelin aircraft in this country, including engines, machinery and all auxiliary equipment. Plans are being perfected for the establishment of works at the Wingfoot Lake Aviation Field, near Akron, while a portion of the present plant at Akron will also be given over to this production. Edward G. Wilmer is chairman of the board of directors.

The Electro Magnetic Loom Corporation, New York, organized with a capital of \$100,000 is said to be perfecting plans for the operation of a plant to manufacture an electromagnetic loom machine for the production of tubing, invented by Charles G. Bauer, Brooklyn. The new company is headed by A. C. Lordly of the A. C. Lordly Co., 320 Broadway, cotton goods broker, who will be president. E. A. Kenney is vice-president, and J. A. Akin, secretary and treasurer.

The Government of South Australia, Adelaide, Australia, has plans for improvements in the South Australian railroad system and will call for bids for equipment in the near future, including wrecking cranes, automatic coal-handling machinery, automatic signal systems and devices and other electrical and mechanical apparatus. Information at the Bureau of Foreign and Domestic Commerce, Washington, Reference No. 108551.

Wright's Health Underwear Co., Second Avenue, North, Troy, N. Y., is planning the installation of a number of motors, from 5 to 50 hp., to a gross of about 200 hp., including compensators, controls and auxiliary apparatus.

Johns-Manville, Inc., Madison Avenue and Forty-first Street, New York, is arranging for the early installation of machinery at its new plant now in course of erection at Asbestos, near St. Johns, Que., comprising two units, 150 x 1000 ft., for the manufacture of brake linings, mechanical packings, asbestos roofing and shingles, etc., to cost more than \$500,000 with equipment. It is purposed to have the works ready for service early next year.

The Western Electric Co., Inc., 195 Broadway, New York, has leased four factory buildings at Westside and Claremont Avenues and Halstead Street, Jersey City, N. J., totaling about 240,000 sq. ft. of floor space. Alterations will be made and the structures equipped for the manufacture of telephone switchboards and kindred equipment. The company is preparing to begin production at its new plant on Frelinghuysen Avenue, Newark, for which property recently was leased, and will employ about 800 persons here. Bids are being asked for superstructure work on a number of units at the new plant at Kearny, N. J.

Manual training equipment will be installed in the new high school to be erected at Avenue A, Twenty-eighth to Thirtieth Streets, Bayonne, N. J., for which foundations and superstructure will soon begin, estimated to cost \$886,000. D. G. Anderson, 717 Broadway, is architect.

The Essex Wire Cloth Co., Belleville, N. J., care of Allen A. Campbell, 798 DeGraw Avenue, Newark, architect, said to be affiliated with the Newark Wire Cloth Co., Verona

Avenue, has plans for a new one-story factory, 55 x 160 ft., on Mill Street, to cost \$25,000.

The American Type Founders Co., Communipaw Avenue, Jersey City, N. J., will soon commence the installation of machinery at its new plant at Elizabeth, N. J., for the manufacture of Kelly printing presses and parts. An appropriation of \$1,000,000 is available for the plant and equipment, with the removal of the present works. R. W. Nelson is president.

The Standard Oil Co. of New Jersey, 26 Broadway, New York, will commence the construction of a new one-, two- and three-story plant at Linden, N. J., to cost about \$300,000 including equipment.

The American Rubber Products Co., Jersey City, N. J., has acquired the factory at Henderson and Eighth Streets, 100 x 250 ft., and will remodel it for a new plant to manufacture mechanical rubber goods.

The Bart Reflector Corporation, Newark, has acquired about one acre at 367 Verona Avenue, Forest Hill district, for the erection of a new one-story plant, 80 x 220 ft., to manufacture indirect lighting fixtures and equipment. The temporary address of the company is care of C. C. Lurich & Co., 4 North Ninth Street, realty agents.

The Tavern Sand Co., Millville, N. J., has commenced the erection of a new site about three miles from the city, for the production of washed silica sand, to cost approximately \$100,000 with machinery. It is said to be affiliated with the Illinois Glass Co., Alton, Ill.

The F. W. Devoe & C. T. Reynolds Co., 223 New Jersey Railroad Avenue, Newark, N. J., manufacturer of paints, varnishes, etc., will commence the erection of a four-story addition, 50 x 70 ft., at 34-36 Oliver Street. J. M. Drummond is company architect. It will cost about \$50,000, including present plant alterations.

The Portland Cement Lumber Co., Woolworth Building, New York, recently organized, will manufacture a new method of concrete building construction through various builders. Early next year the company hopes to equip a material yard and at that time will be in the market for concrete mixing machinery. Guy C. VanAlstyne is treasurer.

The John W. Ferguson Co., Paterson, N. J., has been awarded contract for the erection of two reinforced concrete buildings at the Tarrytown, N. Y., plant of the Chevrolet Motor Co. The contract also includes heating, lighting and sprinkler equipment.

The Northern Union Gas Co., 1815 Webster Avenue, New York, has plans for a new four-story mechanical and repair shop at 304-12 East Kingsbridge Road, 100 x 125 ft., to cost about \$75,000. A portion of the structure will be used for an office. Jardine, Hill & Murdock, 347 Madison Avenue, are architects.

A machine shop will be installed in the four-story and basement automobile service building, 100 x 290 ft., to be erected on Mount Edan Avenue, New York, by M. A. Hoffman, 321 Convent Avenue, estimated to cost \$85,000, for which a general contract has been awarded to S. Niewenhouse, Inc., 412 Eighth Avenue.

New England

BOSTON, Nov. 5.

AGGREGATE sales the past week were as small, if not smaller, than for the previous week. Sentiment is more cheerful, however, for sufficient prospects are developing to make the November outlook more encouraging than anticipated a fortnight ago. Details regarding prospects are withheld by the trade, but no large volume of sales is in the making. With most machine tool houses, October was one of the leanest months this year. Prices generally are well maintained.

During the latter part of October the Pacific Mills, Boston, fabrics, closed on about \$50,000 worth of machine shop equipment for a Southern subsidiary, one machine tool firm getting practically all of the orders. Negotiations for the business, the largest of its kind in several weeks in this territory, were of a more or less private nature.

Hill, Clarke & Co., Inc., 160 Oliver Street, Boston 9, Mass., is inquiring for the following used tools, needed at once; 36-in. diamond face grinder; Walker surface grinder; 36-in. lathe, 20-ft. centers; 14-in. lathe, 14-ft. bed; No. 1½ or No. 2 Cincinnati plain cone type milling machine; 24 or 36-in. planer type milling machine, 12 to 15-ft. table; No. 4 B Becker vertical milling machine; 16 and 18-in. Gould & Eberhardt crank shapers; 400-ton capacity hydraulic embossing press; 3 to 6-in. pipe machine; one hydraulic flanging machine for plates up to ½ in. thick.

Plans will shortly be issued for an addition to be erected by the Pickering Coal Co., Lynn, Mass. Handling equipment will be required.

The Norton Co., Worcester, Mass., abrasives and grinding machinery, will construct a one-story, 47 x 95 ft., manufacturing unit on D Street.

Landers, Frary & Clark, New Britain, Conn., cutlery, etc., have taken bids on a six-story addition, 68 x 161 ft., on Ellis Street.

Barker Factory, Inc., Norwalk, Conn., capitalized for \$100,000, has purchased the plant of Charles L. Barker, Norwalk, and will manufacture marine motors, automobile trucks and gas water heaters. The plant covers several acres. The personnel of the new company consists of F. L. Tuttle, Jr., George T. Tuttle, T. T. Tuttle and M. T. Tuttle.

The Stanley Works, New Britain, Conn., hardware, etc., will build a 60 x 100 ft. manufacturing unit on property adjoining the Stanley Rule & Level Co., subsidiary, and subsequently a 200-ft. addition to the main plant on Whiting Street.

Negotiations have been concluded with the city of Boston for construction in the Allston district of assembling plants to cost approximately \$1,000,000 each, by the International Harvester Co., Chicago, and the International Motor Co., New York, producers of Mack trucks. Locations will be adjacent to the Boston & Albany Railroad. Further details will be announced shortly.

Fire, Oct. 29, destroyed a portion of the plant of the Manchester Marble Co., East Dorset, Vt., known as the Friedley Mill, including roughing, finishing, polishing and other departments, with loss estimated at \$100,000, with machinery. It is planned to rebuild.

The Central Maine Power Co., Augusta, Me., has tentative plans for extensions in power plants and systems. It is purposed to increase the preferred stock from \$8,000,000 to \$15,000,000, and common stock from \$2,500,000 to \$5,000,000, a portion of the proceeds to be used for the expansion.

The Raybestos Co., Bridgeport, Conn., manufacturer of brake lining, etc., will commence the construction of a new power house, 26 x 55 ft.

The American Box Co., 56 West Canton Street, Boston, Mass., is planning the installation of a cutoff saw, double-spindle boring machine and other woodworking tools at its plant.

H. B. Richie, Aroostook, Me., is organizing a company to construct and operate a new brick-manufacturing plant in the Danville Junction, Auburn, Me., to cost more than \$200,000, with machinery. A power house and machine shop will be built. The majority of equipment will be electrically-operated. A tract of eight acres has been acquired from A. F. Redman, Auburn.

The Union Metallic Cartridge Co., Barnum Avenue, Bridgeport, Conn., will build an addition to its power house, for which a general contract has been awarded to the T. J. Pardy Construction Co., Bridgeport.

The New Hampshire Power Co., Newport, N. H., has been organized by Boston interests, with capital of \$65,000

and 6,000 shares of common stock, no par value, to install and operate a power plant in this section. The company is represented by Franklin King, 117 Ames Building, Boston.

The Common Council, Morrisville, Vt., has tentative plans for the construction of a municipal electric light and power plant, estimated to cost \$55,000.

Long Brothers, State Street, Hartford, Conn., are planning for the installation of a lathe, drill press, hack saw and other tools for an automobile machine and repair works.

The Davol Rubber Co., South Street, Providence, R. I., has awarded a general contract to the O. D. Furlington Co., Providence, for a three-story addition, 115 x 170 ft., to cost about \$80,000 with machinery. F. P. Sheldon & Sons, Providence, are engineers.

The Bassett Jewelry Co., Providence, R. I., manufacturing jeweler, has awarded a general contract to the C. I. Bigney Construction Co., 184 Washington Street, for the erection of a new plant at Baker Street and Virginia Avenue.

Philadelphia

PHILADELPHIA, Nov. 5.

TENTATIVE plans are being considered by the Penn Motors Corporation, 1714 North Broad Street, Philadelphia, manufacturer of automobiles and parts, for a new assembling plant at Bridgeton, N. J. to cost \$75,000 with equipment. H. W. Sofield is general manager.

C. M. Roswell, 1162 Marlyn Road, Philadelphia, machinery dealer, has inquiries out for three 100 kva. transformers, with auxiliary electric equipment, 6000-2200 volts.

The American Ice Co., City Central Building, Philadelphia, will expend about \$1,000,000 during the coming year for extensions and improvements, to include the construction of a new ice-manufacturing plant and addition to storage plant at Philadelphia, and similar extensions at Baltimore. The company has disposed of its property and pier on the Delaware River, 1219-25 Beach Street, to the West Jersey Sand & Supply Corporation, Beach and Marlboro Streets, for \$215,000, which will use the site for a new storage and distributing plant.

The Fleischmann Co., 701 Washington Street, New York, has awarded a general contract to the B. A. Groah Construction Co., 847 West North Avenue, Pittsburgh, for a two-story automobile service and repair works for company motor trucks and cars, at Twentieth and Venango Streets, Philadelphia, to cost about \$118,000, including equipment.

The Ford Motor Co., Highland Park, Detroit, has taken title to 68 acres at Sixty-third Street and Elmwood Avenue, Philadelphia, extending to the Schuylkill River for \$450,000. The property heretofore has been held by the Richard De Cou Co., manufacturer of structural iron products, and the William M. Lloyd Lumber Co. Plans are being drawn for an assembling plant estimated to cost \$1,500,000 with machinery, primarily for export account. A wharf with traveling crane will be constructed. The Ford company is now operating assembling works at Broad Street and Lehigh Avenue, and this plant will be maintained as an individual operating unit. W. D. MacTaggart is local manager.

J. F. H. Johnson, 202 North Washington Street, Wilkes-Barre, Pa., is planning for the installation of a lathe, bench and hand tools, and other equipment for a machine repair department in his automobile service building.

The Electric Storage Battery Co., Nineteenth Street and Allegheny Avenue, Philadelphia, has awarded a contract to the William Steele & Sons Co., 219 North Broad Street, for the erection of a new one and two-story plant at Rising Sun Avenue and Adams Road, Crescentville section, to cost \$100,000, including equipment.

The Philadelphia & Reading Railroad Co., Reading Terminal, Philadelphia, will expend about \$1,500,000 for the construction of its new piers at Port Richmond, near Philadelphia, of which about \$350,000 will be used for electric traveling cranes and other handling and conveying machinery.

The Koehler-Latimer Co., Philadelphia, has awarded a general contract to the Truscon Steel Co., South Penn Square, for a new one-story foundry at the southwest corner of Church and Stiles Streets.

The Yellow Cab Co., 1208 North Thirty-first Street, Philadelphia, has purchased a building on Wood Street, 190 x 400 ft., and will remodel it for a central service and repair works.

FitzGibbon & Crisp, Inc., Calhoun and Durham Streets, Trenton, N. J., manufacturer of automobile bodies, has awarded a general contract to Newton A. K. Bugbee & Co., Inc., 206 East Hanover Street, for a one-story addition to cost \$17,000, exclusive of equipment.

The Armstrong Cork Co., foot of Jefferson Street, Camden, N. J., has acquired the former plant of the Argo Mills on adjoining site, and will occupy the property for expansion. Headquarters of the company are on Twenty-fourth Street, Pittsburgh.

The Dexter Metal Mfg. Co., Camden, N. J., has disposed of its plant at Front and Arch Streets, totalling about 100,000 sq. ft. of floor space, to the J. B. Van Sciver Co., which will occupy the property in connection with its local furniture manufacturing works.

The American Chain Co., York, Pa., with headquarters at Bridgeport, Conn., has awarded a contract to the T. J. Pardy Construction Co., Bridgeport, for an addition to its York plant for the manufacture of automobile bumpers, estimated to cost \$500,000 with machinery.

The Keystone Cabinet Co., Chester, Pa., will commence the installation of machinery in a plant at Littlestown, Pa. The B. M. Root Co., 30-38 Jefferson Avenue, York, Pa., manufacturer of saw benches and other woodworking equipment, will furnish a portion of the installation.

C. A. McClure, George W. Crowley, Jr., and associates, Philadelphia, are organizing a new group of electric power companies to be known as the Shirley-Huntingdon, Juniata, Catherine, Lincoln-Huntingdon, Walker, Penn-Huntingdon and Huston Township Power companies, to install and operate plants and systems in their respective territories. The new companies are represented by James Collins Jones, Bullitt Building, Philadelphia.

The Pottsville Building Block Co., 1601 Market Street, Pottsville, Pa., W. J. Biever, president, has tentative plans for the construction of a new plant for the manufacture of cement building blocks, etc.

The Kearns-Dughi Motor Co., Danville, Pa., manufacturer of automobiles and parts, has acquired the plant and business of the Belmont Motor Co., Inc., Lewistown, Pa. The new owner will take early possession and will remove the Danville business to that point later. Charles M. Kearns and M. V. Dughi head the company.

A manual training department will be installed in the two-story high school to be erected at Llewellyn, Pa., estimated to cost \$115,000, for which plans are being prepared by Frank Reilly, 112 South Centre Street, Pottsville, Pa., architect.

The Hazle-Brook Coal Co., Hazleton, Pa., is planning for the installation of additional electric power and mechanical equipment at its Raven Run colliery in the Schuylkill field. Work has commenced on a new steel coal breaker to cost more than \$50,000.

The Derry-Dauphin Electric Co., Harrisburg, Pa., is being organized by W. H. Schubert and L. D. West, to install a plant and system in Derry Township. The company is represented by Cooke & Marvin, Harrisburg.

The Windsor Motor Co., 20 North Fourth Street, Reading, Pa., is having plans prepared for a new three-story service and repair building adjoining its present works. H. G. Mohn, Church and Walnut Streets, Mohnton, Pa., is architect.

Buffalo

BUFFALO, NOV. 5.

A SITE at Childs Street and Hamburg Turnpike, Buffalo, has been acquired by the Buffalo General Electric Co., Electric Building, for a new power house to cost about \$80,000.

Fire, Nov. 1, destroyed a portion of the works of the O. C. Malley Motors, Inc., Geneva, N. Y., with loss estimated at \$200,000 including equipment. It is planned to rebuild.

The Waters Mfg. Co., Lyons Falls, N. Y., is planning the establishment of a new factory to manufacture automobile equipment and accessories. S. W. Sylvester is one of the heads of the company.

The St. Regis Paper Co., Trust Co. Building, Watertown, N. Y., is having plans prepared for a new mill at Deferiet, N. Y., consisting of five units, with power house, machine shop and other buildings, estimated to cost \$500,000 with machinery.

The Saranac Pulp & Paper Co., Plattsburg, N. Y., recently organized, has acquired the former plant of the Lozier Automobile Co. for a new paper mill. H. P. G. Norstrand, previously connected with the Stevens & Thompson Paper Co., Greenwich, N. Y., is general manager.

The Terry-Chevrolet Corporation, Olean, N. Y., local representative for the Chevrolet automobile, is planning for the installation of a drill press, lathe and other equipment in its machine department. L. S. Terry is head.

The Louis Gibaud Motors, Inc., Rochester, N. Y., recently formed by Louis Gibaud, has acquired the former local gun manufacturing plant of the Symington-Anderson Corporation

for \$1,000,000. The property was purchased from the Government several weeks ago by John F. Dailey, 417 Westminster Road, head of the Monroe Warehouse Co., who has established an automobile service and repair works in one of the main buildings, and the present sale includes this plant and equipment, which will be expanded by the new owner.

The Stuart-Oliver Metal Finishing Co., 222 North Water Street, Rochester, N. Y., is planning the installation of equipment for plating metals, enameling and other service. O. D. Stuart is head.

The Trico Products Corporation, 624 Elliott Street, Buffalo, manufacturer of stamped metal products, has filed plans for a four-story addition to cost \$100,000, including equipment. J. R. Oishei is president.

C. Elsmann, care of the Buffalo Vegetable Marketing Co., 29 East Market Street, Buffalo, and associates, have organized the Elba Cold Storage Co., Inc., with capital of \$100,000, and contemplates the erection of a new ice and refrigerating plant on site at Elba, to cost \$80,000 with machinery.

J. A. Dewar, 92 Chestnut Street, Oneonta, N. Y., has awarded a general contract to the Clark Construction Co., Phelps Building, Binghamton, N. Y., for a new automobile service and repair building on Broad Street, to cost about \$70,000 with equipment.

The Clipper Tool Co., Inc., Mills and A Streets, Buffalo, will commence the erection of a one-story addition, totaling about 1500 sq. ft. H. J. Turner is general manager.

The General Railway Signal Co., Lincoln Park, Rochester, N. Y., is concluding arrangements for the purchase of the Federal Signal Co., Albany, N. Y., manufacturer of similar equipment. The property will be operated in conjunction with the purchasing company's works and extended.

The Carborundum Co., Niagara Falls, N. Y., is inquiring for a used ball mill with steel lining, size 6 ft. x 22 in. or 6 ft. x 48 in., preferably Hardinge make.

Pittsburgh

PITTSBURGH, NOV. 5.

THE local machine tool trade is finding plenty of inquiry to bid against, but the more general report is that actual orders are not in keeping with the number of quotations being made. Few large individual lists are before the market outside of the regular quarterly list of the Westinghouse Electric & Mfg. Co., which is being closed against to the extent of the appropriation. Business in cranes and other heavy equipment has been moderate in the past week as compared with the two previous weeks.

The National Plate Glass Co., Detroit, a subsidiary of the General Motors Corporation, has placed the steel for a new plant at Blairsville, Pa., and inquiry has gone out for the cranes and equipment. This business will be placed in Detroit.

The Pittsburgh & Conneaut Dock Co., recently bought two G type punches from the Cleveland Punch & Shear Co., which also has taken orders for a bar shear for the Wyckoff Drawn Steel Co., Pittsburgh, and for two double punches and one horizontal punch for the Pressed Steel Car Co., McKees Rocks, Pa.

Tentative plans are under advisement by the United States Radiator Corporation, Corry, Pa., for the erection of several additional buildings at its local plant. Headquarters of the company are at 125 East Grand River Boulevard, Detroit.

Bids will be called in the near future for the erection of a three-story and basement addition to the plant of the Tranter Mfg. Co., 105 Water Street, Pittsburgh, manufacturer of engines, machinery, etc., at First Avenue and Ferry Street, to cost about \$50,000. Paul W. Irwin, Renshaw Building, is architect.

The Pittsburgh Steel Supply Co., Oliver Building, Pittsburgh, has leased property at Beaver Avenue and McClure Street, Northside, for extensions.

The West Virginia Power Co., Hinton, W. Va., has secured permission for a hydroelectric development on the New River, near the mouth of the Bluestone River, to cost about \$135,000.

The Jaunda Mining Co., 713 Virginia Street, Charleston, W. Va., recently organized with a capital of \$130,000 is planning for the development of property in this section and will take bids in about 30 days for electric power and mechanical equipment. C. W. Estep is president and general manager.

Manual training equipment will be installed in the new two-story junior high school to be erected at Bradford, Pa., estimated to cost \$250,000, for which bids will be called on a general contract to close about Jan. 1. Lawrie, Green & Co., Locust Street, Harrisburg, Pa., are architects.

The Midland Electric Service Co., West Union, W. Va., is reported to have purchased property on Middle Island Creek for the construction of a new plant.

The Warwood Tool Co., Wheeling, W. Va., will expend about \$25,000 for a new one-story machine shop, 42 x 85 ft., and equipment, for which plans have been completed.

The Penn Public Service Corporation, Johnstown, Pa., has arranged for a bond issue of \$2,500,000, a portion of the proceeds to be used for extensions and improvements. F. T. Hepburn is president.

The American Oil Works, Titusville, Pa., is planning to rebuild the portion of its refinery destroyed by fire Oct. 29 with loss estimated at about \$40,000, including equipment and stock.

Manual training equipment will be installed in the new two-story high school to be erected by the Stafford District Board of Education, Gilbert, W. Va., estimated to cost \$100,000, for which bids will be received on a general contract until Nov. 30. L. J. Dean, Huntington, W. Va., is architect.

The Pennsylvania Engineering Works, New Castle, Pa., operating a steel fabricating plant, is planning the installation of additional equipment, including a flanging press, plate planer, vertical punch, rotary shear, etc.

Milwaukee

MILWAUKEE, NOV. 5.

VOLUME of machine tool sales has dwindled slightly, with industrial buyers manifesting less interest in offerings and making purchases only when urgent needs require. While some railroad business is coming to local shops, the amount is very small and it does not balance the decline in the demand from other sources. There is a lot of business in the foreground, but it is not expected to develop before next spring. Automotive industries as a whole are doing very little equipment buying, although a few of the largest builders are plying out equipment and buying for replacement. Caution is evident in all lines and is a heavy contributing factor in the shrinkage of tool trade.

The Board of Industrial Education, Oshkosh, Wis., has engaged Auler & Jensen, local architects, to design a \$350,000 addition to the Beach Memorial vocational school, to provide for manual training shops, gymnasium and classrooms. Bids will be taken about Dec. 15. Equipment for shops has not yet been listed and probably will not be purchased until next spring.

The Board of Public Works, Menasha, Wis., is asking bids for furnishing and installing a 600-hp. oil-burning engine for an addition to the municipal water and light plant, to supplement two 300-hp. Diesel type generators now in use. John F. DeCaro is city clerk.

The United States Automatic Shift Co. of Eau Claire, Wis., has been incorporated with 6000 shares of common stock without par value, by B. R. L'Hommiedieu, John S. Allen and A. C. Larson all of Madison, Wis. It will take over the plant of the defunct United States Gear Shift Co. of Eau Claire bid in by Mr. L'Hommiedieu at trustee's sale several months ago. Some retooling will be done, as the new owners intend to manufacture a general line of mechanical devices, metal specialties and tools, in addition to hydraulic gear shifting units for motor vehicles.

The Peterson & Egeland Mfg. Co., Sturgeon Bay, Wis., which several months ago equipped a small shop for the manufacture of a patented engine stand for garage use, is purchasing additional machinery. It has taken over the garage building of Peterson Brothers, who are retiring from the automobile trade to concentrate on the production of the fixture.

The Follen-Lorenz Tool Works has been organized at Kenosha, Wis., by Lorenz Follen and Frederick and Henry Lorenz to engage in engineering, tool and die jobbing, metal stamping and deep drawing, and the manufacture of a device for canceling checks, labels, etc. Most of the equipment required has been purchased from the trustee of the bankrupt Mitchell Motors Co., Racine, Wis., which is being installed in a two-story building on Avery Street, Kenosha. In the meantime it is operating in the plant of the defunct K. & F. Mfg. Co., Kenosha, and has taken over all uncompleted contracts, including a large order for steering gear locks.

The B. F. & H. L. Sweet Mfg. Co., Fond du Lac, Wis.,

wagon and sleigh manufacturer, is adding some equipment and enlarging its capacity for handling several large orders for heavy-duty sleds for use in tractor trains in mining, oil well operation and logging. The Standard Oil Co. of California has placed a contract for 25-ton sleds for hauling machinery to wells, and the Treadwell Mining Co. of Alaska for hauling gold ore.

The Helm Cut Stone Co., 578 Locust Street, Appleton, Wis., which is erecting a new plant, is inquiring for an air compressor, a carborundum saw, one 5-ton and one 2-ton hand operated traveling crane, two jib cranes and several small motors. Christ Helm is president.

The Fox Motor Car Co., Madison, Wis., has acquired a site, 72 x 165 ft., on University Avenue and next spring will build a two-story garage and service building of similar dimensions, at an estimated cost of \$45,000.

The Fox River Valley Co-Operative Co., Neenah, Wis., has awarded contracts for the construction of a two-story concrete cheese warehouse, 40 x 80 ft., and is inquiring for artificial ice and refrigerating machinery. Eli Defnet, 157 East Forest Avenue, is secretary-treasurer. The architect is B. E. Mehner, Fond du Lac, Wis.

The common council of Hurley, Wis., has rejected all bids received Oct. 23 for a water purification plant, pumping station and intake, and is asking new tenders under revised specifications until Nov. 13. J. H. A. Brahtz, 409 Metropolitan Building, St. Paul, Minn., is engineer in charge.

The Board of Education, Mineral Point, Wis., has engaged Edward Tough, architect, Washington Building, Madison, Wis., to prepare plans for a new high school with vocational shops, to cost about \$150,000 complete. Bids will be taken about Jan. 1, by A. M. Tucker, secretary of the board.

The Winther Motor Co., Kenosha, Wis., a new corporation which has acquired the assets of the defunct Winther Motors, Inc., same city, is engaged in preparing the works for a resumption of manufacturing on Dec. 1. A small number of miscellaneous tools will be needed for replacements and rearrangement of the layout. R. D. Mock has been elected vice-president and will serve also as general manager.

Cleveland

CLEVELAND, NOV. 5.

THE Ford Motor Co., Detroit, has placed an order for 60 standard automatic screw machines with a Cleveland manufacturer and an inquiry is pending for 70 automatic machines from an Eastern maker of automobile parts. The United Ejector Co., Boston, has placed 60 large turret lathes with a Cleveland manufacturer and the Maxwell Motor Car Co., and the Chevrolet Motor Co., Detroit, and the Bronx Equipment Co., New York, each have purchased two similar machines from the same interest. A local manufacturer of turret lathes reports a 30 per cent increase in orders in October as compared with September, most of the orders being for single machines. Machine tool manufacturers are figuring on single machines in the lists recently issued by the Baltimore & Ohio and Rock Island Railroads. Business is quiet with local dealers, sales for the most part being limited to single machines. New inquiry is light.

The White Motor Co., Cleveland, will build extensions and a larger garage involving an expenditure of \$125,000. The erection of these buildings will be part of a construction program outlined some time ago. The general contract has been placed with the Watson Engineering Co., Cleveland.

The Park Battery Co., Cleveland, has placed a contract with the Austin Co. for a factory building at 277 East 156th Street. The estimated cost is about \$50,000.

The Fisher Body Corporation, Detroit and Cleveland, has purchased a portion of the Kelsey Wheel Co. interests in Memphis, Tenn. The property acquired includes an automobile body woodworking plant, saw mill and dry kilns. The Kelsey company retains the portion of the plant used in the manufacture of automobile wheels.

The Indianapolis Light & Heat Co., Indianapolis, Ind., will erect a new power plant of 60,000-kw. capacity, and the Columbus Railway Light & Power Co. plans the erection of a new power plant of similar capacity to be located at a coal mine near Columbus. The latter company has just placed an order with the General Electric Co. for a 15,000-kw. addition to its Mill Street station in Columbus.

A new plant for the manufacture of steel tubing is being equipped in Warren, Ohio, by I. VanHuffel. It will be located in the manufacturing building formerly occupied by the King Furniture Co.

The Bingham Stamping Co., Toledo, Ohio, has had plans prepared for an extension which will largely increase its present capacity. Additional equipment will be required, including special machinery and furnaces.

The Standard Sanitary Mfg. Co. has placed a contract for an addition to its Tiffin, Ohio, plant.

The National Stove Co. Division of the American Stove Co. is planning the erection of a \$100,000 addition to its Lorain, Ohio, works. Tentative plans provide for a two-story brick building with 40,000 sq. ft. of floor space.

The Colonial Tool & Forge Co., Columbiana, Ohio, is moving its plant to Elkton, Md., where larger quarters have been provided. The company, which was formerly the Harrold Forge & Tool Co. manufacturer of screw drivers and other mechanics hand tools. L. V. Blue will remain as president of the company. H. R. Orr, secretary and treasurer, will retire.

Chicago

CHICAGO, Nov. 5.

THE Burlington has distributed a number of formal orders against its list, having placed 25 lathes ranging from 18 to 30-in. swing and six heavy duty shapers, besides a number of miscellaneous tools. The Illinois Central has closed for a carwheel lathe. The Chicago Great Western is inquiring for a used 42-in. x 42-in. x 12-ft. planer. Business from industrial sources is more promising. A southern Illinois buyer is inquiring for from \$35,000 to \$40,000 worth of equipment, while a Chicago plant wants about \$50,000 worth of tools. A Milwaukee user has closed for a 42-in. open side planer and is still in the market for additional machines. The Remy Electric Co., Anderson, Ind., has placed orders for two turret lathes. Local steel interests are about to close for a number of heavy special purpose machines.

The Whiting Corporation, Harvey, Ill., has taken the following orders for foundry equipment: No. 10 cupola for the Kohler Co., Kohler, Wis.; a No. 5 cupola for the Ravenna Iron Co., Ravenna, N. Y.; and a crane reservoir ladle of 4000-lb. capacity for the Maytag Co., Newton, Iowa.

The Nugent Steel Casting Co., 3100 South Wood Street, Chicago, is building a two-story reinforced concrete pattern storage building, 40 x 120 ft., with provision for a future third story which will probably be added within a year. Frank C. Chase, Inc., Chicago, has been retained as engineer.

The Standard Sanitary Mfg. Co. is taking bids through Alfred S. Alschuler, 28 East Jackson Boulevard, Chicago, on a five-story and basement factory, 115 x 203 ft., at 3716-26 Iron Street, Central Manufacturing District, Chicago. The present main factory of the company at 14-30 North Peoria Street, which was planned by the same architect about ten years ago, is now inadequate.

The Grigsby, Grunow & Hinds Co., manufacturer of automobile accessories, 906 West Lake Street, Chicago, has placed contract for a two-story plant, 150 x 188 ft., at 4534-46 Armitage Avenue, to cost \$250,000.

Edward G. McClellan, 7441 Cottage Grove Avenue, Chicago, has taken bids on a one-story automobile service station and garage, 200 x 200 ft., at the northwest corner of East Sixty-third Street and Indiana Avenue, for Virgil Cunningham, to cost \$140,000.

The Chicago Steel & Wire Co., 10243 Torrence Avenue, Chicago, has awarded contract for a one-story addition, 60 x 249 ft. and a one-story steel shed in the rear, to cost \$50,000.

The Aermotor Co., 2500 West Roosevelt Road, Chicago, has let contract for a one-story plant, 80 x 165 ft., at 2508 West Roosevelt Road, to cost \$18,000.

The Remy Electric Co., Anderson, Ind., has commenced the construction of an addition, 40 x 80 ft., to cost \$25,000.

Paper, Calmenson & Co., 975 East Seventh Street, St. Paul, Minn., are in the market for a gate shear, capacity to cut up to 72-in. plates of 1 in. thickness.

The Orton & Steinbrenner Co., 608 South Dearborn Street, Chicago, manufacturer of locomotive cranes, buckets and coal crushers, has completed an addition to its works at Huntington, Ind., which will approximately double the former output. All equipment has been purchased and most of it is in use.

Plans are being drawn by the Minnesota Valley Canning Co., Lesueur, Minn., for the erection of a new power plant to cost \$50,000. W. G. Taylor is president.

The Northwest Utilities Co., Spring Valley, Minn., has arranged for an increase in capital from \$10,000,000 to

\$45,000,000, a portion of the proceeds to be used for extensions.

The Eagle Iron Works, Des Moines, Iowa, has plans for an addition, 61 x 66 ft.

The Rocky Mountain Marble Co., Carbondale, Colo., is planning the construction of a new plant, 70 x 250 ft. A machine shop will also be built. The installation will include a 20-ton traveling crane. Inquiries will be made at an early date for equipment, including open side planer, rubbing beds, grinding machines, etc.

The Domestic and Foreign Commerce Department, Chicago Association of Commerce, 10 South La Salle Street, has received an inquiry from a company at Havana, Cuba, in the market for woodworking machinery (No. 2475); also from a company at Chattanooga, Tenn., in the market for a large quantity of metal ceiling (No. 2474).

The Common Council, Owatonna, Minn., is arranging an appropriation of about \$350,000, for the construction of a municipal electric light and power plant, for which an engineer will soon be selected to prepare plans.

The Central Light & Power Co., Washburn, N. Dak., recently organized, has acquired the local plant and system of the Central Power Co., and plans extensions and improvements, including the installation of additional equipment. J. G. Robertson, St. Paul, Minn., heads the new company.

The Crane Co., 836 South Michigan Avenue, Chicago, manufacturer of steam specialties, pipe, etc., will take bids within two weeks for a two-story foundry, 160 x 500 ft., at its plant on South Kedzie Avenue, to cost approximately \$1,000,000, with machinery. Graham, Anderson, Probst & White, 80 East Jackson Boulevard, are architects.

The Central South

ST. LOUIS, Nov. 5.

PLANS are being considered by the Pittsburg Marble Works, 101 North Elm Street, Pittsburg, Kan., for a one-story branch plant at Kansas City, Kan., estimated to cost \$100,000 with equipment. P. W. White is president.

The National Lamp Works of the General Electric Co., 6251 Etzel Avenue, St. Louis, is said to be planning for enlargements and the installation of additional machinery to increase the output from 60,000 to 100,000 lamps per day.

The Acme Electric Co., 2121 East Thirty-ninth Street, Kansas City, Mo., is planning for the installation of a punch press, about 5 to 7 tons capacity.

The Tennessee Electric Power Co., Chattanooga, Tenn., has acquired the Jefferson City Power & Light Co., Jefferson City, Tenn., and will make extensions and improvements in the plant and system. Operations will also be extended to White Pine, Tenn.

Manual training equipment will be installed in the new high school to be erected at Sedalia, Mo., estimated to cost \$350,000, for which bids will be called on a general contract. T. W. Bast, Kahn Building, is architect.

The Dehco Enameling Co., 1305 Waldheim Building, Kansas City, Mo., has inquiries out for a 10 to 12-hp. boiler, and auxiliary equipment.

The Ford Motor Co., Highland Park, Detroit, has acquired property at Bismarck, Mo., heretofore held by the Irondale Lead Mines, and plans development of the property and the installation of equipment.

The American Cigar Box Lumber Co., Johnson City, Tenn., has engaged Lockwood, Greene & Co., 24 Federal Street, Boston, and Charlotte, N. C., engineers, to prepare plans for extensions and improvements, including the remodeling of the present structures and the installation of additional machinery for considerable increase in output.

The Sutton Coal Co., Sutton, Ky., is perfecting plans for the installation of electric power and other equipment at its properties.

The Equipment Sales Co., Independent Life Building, Nashville, Tenn., has inquiries out for two jaw crushers, 48 x 60 in. and 36 x 48 in., respectively.

The Common Council, Maramec, Okla., plans the installation of electrically-operated pumping machinery in connection with a new waterworks system.

The Tennessee Cotton Oil Co., Jackson, Tenn., is planning to rebuild the portion of its plant at Greenfield, Tenn., recently destroyed by fire with loss of about \$25,000.

The Duncan Machinery Co., P. O. Box 265, Knoxville, Tenn., machinery dealer, has inquiries out for a No. 1 gyratory crusher, second-hand.

H. H. Hervy, 209 Oak Street, Kansas City, Mo., machinery dealer, has inquiries out for a bar-bending machine.

Bids will soon be asked by the Common Council, Arkansas City, Kan., for pumping machinery and other equipment for waterworks extensions and improvements. M. N. Sinnott is city clerk.

A power house will be constructed at the proposed textile mill to be constructed at Camden, Ark., estimated to cost \$1,000,000. A company is being organized by J. T. Roundtree, Jr., Paris, Tex., to carry out the project. The Chamber of Commerce, Camden, is interested.

The Common Council, Drexel, Mo., plans for the installation of electrically-operated pumping machinery at its proposed new waterworks, estimated to cost \$50,000. J. P. Davis, 305 Central Trust Building, Jefferson City, Mo., is consulting engineer.

The Public Light & Power Co., Chattanooga, Tenn., will commence the construction of a new hydroelectric power plant in the vicinity of Shelbyville, Tenn., estimated to cost \$90,000. L. W. Hope is engineer in charge.

The Vernon Asphalt Co., Nevada, Mo., recently organized with a capital of \$150,000, is planning the establishment of a plant for the production of asphalt, with installation of electric power equipment, reduction machinery and auxiliary equipment estimated to cost about \$0,000. John A. Lohmeyer, Joplin, Mo., is president; and L. A. Johnson, Nevada, secretary.

The B. J. Mullikin Tire Co., Times Building, St. Louis, recently organized with a capital of \$250,000, has secured a six-story building for a new plant. B. J. Mullikin is president, and George G. Vost, secretary-treasurer.

The Atlantic Ice & Cold Storage Co., Chattanooga, Tenn., is considering the construction of an addition to its plant to cost \$80,000, including equipment.

The Texarkana Water Corporation, Texarkana, Ark.-Tex., is planning for the installation of pumping machinery at its local waterworks, in connection with extensions and improvements to cost \$300,000.

The Jarpy Machine Works, 110 West Eighth Street, Lawrence, Kan., is planning for the installation of a bench milling machine, used, in good condition.

The Chaplin & Anderson Stone Co., 332 West Mill Street, Springfield, Mo., is planning the erection of new works estimated to cost \$30,000 with machinery.

Cincinnati

CINCINNATI, Nov. 5.

A FAIR number of orders were reported by local manufacturers during the past week, but the October rate of bookings was scarcely maintained. Some dealers who had been figuring on prospects report that there is a tendency to put off buying until after the first of the year. However, the tone of the market is generally optimistic. There has been steady buying by automobile companies, electrical manufacturers, steel interests, and by local safe and lock companies. Railroads, too, have contributed to current activity, and with closing of lists now out, are expected to place a number of large orders the remainder of the year.

Japanese buying is reported to be in prospect. Some orders are being placed for used equipment on which quick delivery can be made, particularly planers and boring mills. Dealers report that options have been taken on all the large planers and boring mills in stock. New machine tools for Japanese shipment have not totaled much as yet, but action is looked for on an inquiry for 100 lathes reported in this column several weeks ago. This inquiry, received through an exporting house in New York, is expected to be turned over to the Japanese embassy at Washington.

The Sawbrook Steel Casting Co., Cincinnati, has been incorporated with a capitalization of \$300,000. It will erect a steel foundry, but the location has not been announced. E. S. Sawtelle, C. E. Sawtelle and E. L. Brooks, of the Tool Steel Gear & Pinion Co., are the incorporators.

The Stewart Burner Co., Cincinnati, has been organized to handle the sale of a burner manufactured by the John A. Stewart Co., Water and Vine Streets. It is not the present intention of the company to establish a plant for the manufacture of its product, but eventually this will be done. John H. Stewart is president.

Plans for the reorganization of the Anderson Foundry & Machine Co., Anderson, Ind., recently placed in receiver's hands, are being discussed by Bert McBride, receiver for the

Dollings interests in Indiana, and W. T. Durbin, receiver for the Anderson Co. The Anderson Foundry & Machine Co. has been operated at a profit under the receivership, and it is expected that reorganization plans will be approved by the stockholders.

The Gulf States

BIRMINGHAM, Nov. 5.

FIRE, Oct. 29, destroyed a portion of the No. 8 oil refinery of the Chestnutt & Smith Corporation, Ranger, Tex., with loss reported at \$500,000 including machinery. It is planned to rebuild. Headquarters are at Tulsa, Okla.

The Capital City Auto Co., Baton Rouge, La., will commence the construction of a new three-story service building, 95 x 130 ft., at Main and Menard Streets, to cost \$75,000. The second floor will be equipped for a machine shop. Jones, Rousell & Olchner, New Orleans, La., are architects.

The Gulf States Oil Corporation, New Orleans, has acquired the local refinery of the Island Oil & Transport Co., as well as other properties of the company. Improvements will be made and operations commenced at an early date.

The Granite Brick & Block Co., Sebring, Fla., has acquired local property and plans the erection of a new works. Machinery will be installed for an initial output of 10,000 brick per day.

The Common Council, Lubbock, Tex., has called a special election on Nov. 21 to vote bonds for \$50,000, for the purchase of machinery for the municipal electric power plant.

Fire, Nov. 1, destroyed a portion of the plant of the Enochs Lumber Mfg. Co., Jackson, Miss., with loss of about \$400,000 including equipment. It is planned to rebuild.

The Southern Iron & Machine Co., San Benito, Tex., is planning for the installation of a new lathe, 42 or 48 in. long, with bed 30 or 40 ft.

Manual training equipment will be installed in the new two-story high school to be erected at Brookhaven, Miss., estimated to cost \$110,000, for which ground will be broken at once. Emmett J. Hull, Jackson, Miss., is architect.

The American Fibre Corporation, Kelsey City, Fla., recently organized with a capital of \$500,000, has tentative plans for the construction of a plant, to cost about \$150,000 with machinery. A power house will be erected. William H. Power, West Palm Beach, Fla., is secretary and treasurer.

The Humble Oil Co., Houston, Tex., will install additional machinery at its pumping plant on the Thompson tract, near Mexia, Tex., including a 150 hp. engine and auxiliary equipment.

The Houston Railway Car Co., P. O. Box 223, Houston, Tex., is planning for the installation of galvanizing and other machinery for the manufacture of tanks and other galvanized products.

The Odorless Plant Food Co., Miami, Fla., recently organized with a capital of \$100,000, contemplates the installation of a power house at its proposed plant for the manufacture of fertilizer products. Norman W. Graves, Miami, is head.

The East Coast Improvement Co., Miami, Fla., recently formed with a capital of \$100,000, plans for the installation of an electric lighting plant on a 500-acre tract to be developed. A waterworks, with pumping machinery, will also be constructed. A. T. Barkdull, Miami, is president; P. F. Patton, Hendersonville, N. C., is construction engineer.

The American Public Service Co., a subsidiary of the Middle West Utilities, 72 West Adams Street, Chicago, has acquired electric plants and systems at Grand Saline, Alba, Quitman, Winnsboro, Big Sandy, Gladwater and vicinity. Plans are under way for extensions and the installation of transmission lines and other equipment. The purchasing company recently issued bonds for \$1,500,000.

The Southern Pacific Railroad Co., El Paso, Tex., is said to be arranging for the construction of new car and locomotive shops at Valentine, Tex., to cost \$500,000 with machinery. H. M. Lull, Houston, Tex., is chief engineer.

W. J. Bickerstaff, Brickyard, Ala., has inquiries out for a hoisting engine and kindred equipment for lumber haulage.

The Southern Cabinet Co., 610 North McDonough Street, Montgomery, Ala., has taken over a local building and will install equipment for the manufacture of kitchen cabinets and kindred products. A specialty will also be made of porcelain-top tables. John B. Noble is president.

The Houston Lighting & Power Co., Houston, Tex., has authorized plans for extensions and improvements in its power plant to cost \$60,000. Additional equipment will be installed.

The Southern Glass Novelty Co., Monroe, La., has ac-

quired about 5 acres and plans the erection of a new works. The first unit will cost about \$60,000, including partial equipment. Other units will be built later. A. H. Sweet, Lancaster, Ohio, heads the company.

The Board of Water Commissioners, Houston, Tex., has preliminary plans for an electrically-operated pumping plant in the vicinity of Buffalo Bayou, to cost about \$500,000 with machinery. Work will commence early next year. A new central pumping station at the main waterworks is also proposed, to cost approximately \$30,000. James H. B. House is head of the bureau.

The Common Council, Clifton, Tex., is taking bids for the installation of a municipal electric power plant, to cost about \$30,000.

Indiana

INDIANAPOLIS, Nov. 5.

PLANs are projected by the Indianapolis Light & Heat Co., Indianapolis, for a new central generating plant on 145 acres recently acquired on the White River, about eight miles from the city. It is estimated to cost about \$1,000,000. Work will commence next year. C. C. Perry is president.

Officials of the Arvac Mfg. Co., Anderson, Ind., manufacturer of universal joints, etc., whose plant recently was sold to Winfred Jessup, Richmond, Ind., and associates, have tentative plans for the erection of a new works to replace the former factory, for a similar line of production.

The New Albany Loose Leaf Tobacco Co., Clark and Locust Streets, New Albany, Ind., is said to be planning the installation of a number of hydraulic presses.

Stockholders of the Indiana Oil Refining Co., Columbus, Ind., have authorized a fund of \$125,000 for extensions and improvements and the installation of equipment.

Fire, Oct. 28, destroyed a portion of the works of the Hoosier Veneer Co., Massachusetts Avenue and Adams Street, Indianapolis, with loss approximating \$70,000, including equipment and stock. It is planned to rebuild.

Kingan & Co., Georgia Street, Indianapolis, operating a meat-packing plant, will remodel an existing two-story building, 80 x 120 ft., for a new chilling and refrigerating plant. Ice machinery and other equipment to cost about \$20,000 will be installed.

Detroit

DETROIT, Nov. 5.

FIRE, Oct. 27, destroyed a portion of the plant of the Rich Steel Products Co., Battle Creek, Mich., with loss estimated at \$150,000, including equipment. It is planned to rebuild.

The Beattie Machinery & Service Co., 1946 Baker Street, Detroit, has plans for a one-story addition for a general machine and repair shop.

The Detroit Concrete Receptacle Co., 4225-27 Michigan Avenue, Detroit, is considering the construction of a new plant at Woodward Heights Boulevard, estimated to cost \$250,000 with machinery.

The Inland Automobile Co., Grand Blanc, Mich., has tentative plans for a one-story addition to cost approximately \$35,000. It is purposed to commence work early in the coming year. C. C. Kinnison is president.

The Kroger Grocery & Baking Co., 4760 Merritt Avenue, Detroit, is planning the erection of an automobile service and repair building, estimated to cost \$90,000 with equipment.

The Petoskey Portland Cement Co., Petoskey, Mich., has plans under way for extensions to increase the output from 2500 to 4500 bbl. per day. The work will include a new power plant and is estimated to cost more than \$150,000 with machinery.

The Valley Paper Co., Press Building, Kalamazoo, Mich., will build a one-story machine shop.

The Auto Specialty Mfg. Co., St. Joseph, Mich., will commence the erection of a foundry to cost approximately \$100,000, including equipment, for which plans have been drawn by Davidson & Weiss, 53 West Jackson Boulevard, Chicago, architects and engineers.

The Olds Motor Works, Lansing, Mich., a division of the General Motors Corporation, has work in progress at its plant to provide for a maximum production of 400 complete automobiles per day. Additional equipment will be installed.

The United Automatic Screw Co., Wesson Avenue, Detroit, has awarded a general contract to the Home Building Co., 2187 West Grand Boulevard, for the erection of a one-story plant, 50 x 150 ft., to cost \$43,000 including equipment. J. S. Barrow is head.

The Keeler Brass Co., Grand Rapids, Mich., has filed plans for the erection of an addition at 234 Stevens Street, estimated to cost \$36,000 with equipment.

The Kelly Well Co., Inc., Grand Island, Neb., manufacturer of special concrete wells, has leased the plant of the Gregg Pump Co., Fulford Street, Kalamazoo, Mich., for the establishment of a new works. The company purposes to form another company under Michigan laws, with capital of \$200,000, to be operated as a subsidiary. The acquired works will be improved and equipment installed for production. E. J. Long is general manager.

Baltimore

BALTIMORE, Nov. 5.

CONSTRUCTION is under way on a new plant for the United States Industrial Chemical Co., 110 East Forty-second Street, New York, at Fairfield, near Baltimore, with power house and machine shop, to cost approximately \$1,000,000 with equipment. The plant will be used for commercial potash and kindred production. Plans are now being prepared for the erection of another unit for fertilizer manufacture, to cost close to \$200,000 with machinery.

The Purchasing Agent, United States Post Office Department, Washington, will take bids until Nov. 16 for one stationary air compressor.

The Virginia-Carolina Housing Co., P. O. Box 131, Richmond, Va., has inquiries out for a hoisting engine, about 15 hp., double drum; also, for a portable concrete mixer, about 1½-yd. capacity.

Manual training equipment will be installed in the new three-story high school to be erected at Hagerstown, Md., estimated to cost \$250,000, for which plans are being prepared by A. J. Klinkhart, 54 West Washington Street, architect.

The Roanoke Rapids Power Co., Roanoke Rapids, N. C., has awarded a contract to Stone & Webster, Inc., 147 Milk Street, Boston, engineer, for an addition to its generating plant, with installation to include a new 3000 kva. generator and auxiliary machinery.

The Qultman Machine Co., Qultman, Ga., is planning to rebuild the portion of its plant recently destroyed by fire, with loss estimated at about \$40,000 including equipment.

The Charlotte Electric Repair Co., Charlotte, N. C., has inquiries out for a number of electric motors, three-phase, 60-cycle.

The Esselman Motor Co., 3325 Greenmount Avenue, Baltimore, will take bids for a two-story automobile service and repair building, 125 x 152 ft., to cost about \$50,000. G. Esselman is president.

Willis Irvin, Lamar Building, Augusta, Ga., has inquiries out for equipment for an electric light and power plant.

The Consolidated Power & Light Co., Lynchburg, Va., is disposing of a preferred stock issue of \$1,500,000, a portion of the proceeds to be used for extensions and improvements.

The Community Refrigerating Co., Burlington, N. C., is planning for the establishment of a new ice-manufacturing and refrigerating plant at Jacksonville, Fla.

Electric power equipment, control apparatus, and other conveying machinery will be installed in the new six-story printing plant 60 x 250 ft., to be constructed by the Baltimore American, Baltimore, to cost \$500,000. A building contract has been let to Frainie Brothers & Haigley, 19 West Franklin Street. George R. Callis, Jr., American Building, is architect.

Bids will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, until Nov. 13, for 100 sets of wrenches for mine assemblies for the navy mine depot, Yorktown, Va., schedule 1541; also, for one set of brine circulating pumps for the Norfolk, Va., Navy Yard, schedule 1533; until Nov. 27, for steel wire nails, for Eastern and Western Navy Yards, schedule 1525; for flashlights for Eastern and Western yards, schedule 1532; and for electrical supplies and apparatus for Eastern and Western yards, schedules 1530 and 1540.

W. A. Williams and F. I. Mason, Rockingham, N. C., are organizing a company to operate a plant for the manufacture of cutters and cutting machines for green cotton stacks and other service.

The Common Council, Williamsport, Md., is considering the installation of electrically-operated pumping machinery in connection with a new waterworks system, for which plans are being prepared by Norton, Bird & Whitman, Munsey Building, Baltimore, engineers.

The Chamber of Commerce, Oakland, Md., has concluded negotiations for a new plant to manufacture skid chains, on which work will commence in about 60 days. The

name of the company which will build and operate the plant is withheld temporarily.

Manual training equipment will be installed in the senior and junior high school to be erected at Hendersonville, N. C., estimated to cost \$300,000. E. G. Stillwell, Hendersonville, is architect.

Bids will be received by the General Purchasing Officer, Panama Canal, Washington, until Nov. 19, for two watertube boilers, four motors, 10,000 ft. of rubber insulated wire, 434 pounds of magnet wire, 10,000 ft. single conductor wire, machine bolts, carriage bolts, steel rivets, wood screws, 2500 lb. of machine-bolt nuts, and 2000 lb. of lead washers, circular 1569, until Nov. 12 for 100 tumbler switches, 50 mounted switches, 50 surface pipe switches, 388 steel oilers, 10 gross of brass washers, 1000 grip unit nuts, 2000 steel lock washers, locks and other hardware products, circular 2338, and until Nov. 22 for one refrigerating outfit, one gasoline section car, and miscellaneous electrical and mechanical equipment, circular 1570.

The Common Council, Farmville, Va., has preliminary plans for extensions and improvements in the municipal electric power plant to cost about \$50,000, including the installation of additional equipment.

The Hackley-Morrison Co., Inc., 1708 Lewis Street, Richmond, Va., machinery dealer, has inquiries out for a power key-seating machine, to handle material from 1-16-in to 1-in. thick; also for a number of electric motors, 75 hp. and 1 hp.

The Common Council, Woodbury, Ga., is planning to rebuild the portion of the municipal electric light and power plant recently destroyed by fire. New equipment will be installed.

The Roanoke Gas Light Co., Roanoke, Va., is planning for the installation of a new steam power plant in connection with extensions and improvements in its system.

British Iron and Steel Market

Japan Still Buying Heavy Tonnages of Black and Galvanized Sheets—Improvement in Steel Continues—Ruhr Stocks Cause Concern

(By Cable)

LONDON, ENGLAND, Nov. 3.

Pig iron is quieter but prices are well maintained. The recent heavy buying has eaten into accumulated stocks and expansion of output is contemplated but not yet effected. Hematite is improving, with few sellers below £5 (\$22.30) for East Coast mixed tonnage.

Foreign ore is quiet but firmer. Sellers of best Bilbao Rubio ask 23s. (\$5.23) c.i.f. Tees.

Improvement in steel continues—mainly in structural material. Makers are reluctant to quote forward delivery except at higher rates. The boiler makers' dispute still is unsettled. Substantial shipbuilding orders are waiting for the settlement.

Continental markets are disorganized. Some works are well sold; others are in want of orders. Buyers generally are cautious, owing to the uncertainty regarding the future disposal of the Ruhr stocks. Luxembourg reports dumping into Holland of Ruhr steel and selling it at low prices.

Tin plate is strong, with large business, both domestic and export. Works are well sold for a few months ahead and makers are asking higher prices owing to a dearer tendency in their steel. It is expected that the price agreement will be extended for a further period of one year. The central selling scheme virtually has been dropped.

Galvanized sheets are firm but quiet. The Far East is buying for early shipment, but the works are heavily committed.

Black sheets are strong; the Far Eastern demand continues. No. 26 gage CA has been advanced to £15 10s. (3.09c. per lb.) and No. 28 gage to £17 (3.39c. per lb.) net f.o.b. Japan 6 x 3, 13's, 107 lb. are selling up to £21 10s. (4.28c. per lb.).

Canada

TORONTO, Nov. 5.

BUSINESS in the machine tool market is holding its own and sales sheets for October will show some improvement over September. Inquiries and prospective business for the present month are promising. In both Ontario and Quebec provinces a stronger tone is noted in the demand for electrical equipment. The automotive industry throughout Canada is actively engaged and is also a steady customer for tools for replacement purposes. Generally speaking, the iron and steel industry of Canada has been a more consistent buyer of tools this year than for some time past and it is expected that business from this source will continue.

L. N. Huart, Commercial Street, Levis, Que., contemplates the erection of power plant on Megiscan River near Temiscamingue, Que., to develop 22,000 hp.

M. Viau, St. Jerome, Que., is asking for prices on machine tools and general foundry equipment.

The Canadian Yellow Cab Mfg. Co., Montreal, Que., recently incorporated, will make and repair taxicabs, and is interested in equipment for this undertaking. A. H. Elder, 22 Summerhill Avenue, Montreal, is purchasing agent.

The Castle-Trethewey Mines, Standard Bank Bldg., Toronto, is asking for stamps, tube and ball mills, pumps, cyanide apparatus and crushers for a 100-ton gold mining mill at Gowganda, Ont.

The Spanish River Lumber Co., Cutler, Ont., is in the market for band saws, resaws, edgers, planers, etc., for steam power lumber and sawmill to replace one recently destroyed by fire. W. J. Bell is manager.

We quote per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at \$4.46 per £1, as follows:

Durham coke, delivered	£1 19s.	to £2 0s.	\$8.70 to \$8.92
Bilbao Rubio oref.	1 4		5.35
Cleveland No. 1 foundry	5 7½		23.97
Cleveland No. 3 foundry	5 0		22.30
Cleveland No. 4 foundry	4 19		22.08
Cleveland No. 4 forge..	4 17½	to 4 18	21.74 to 21.85
Cleveland basic.	4 12½	to 4 15	20.63 to 21.18
East Coast mixed.	4 19½	to 5 0	22.19 to 22.30
East Coast hematite.	4 19	to 5 0	22.08 to 22.30
Ferromanganese.	17 0		75.82
Ferromanganese*	17 0		75.82
Rails, 60 lb. and up.	8 0	to 9 0	35.68 to 40.14
Billets.	7 10	to 8 5	33.45 to 36.79
Sheet and tin plate bars,			
Welsh.	9 2½		40.71
Tin plates, base box.	1 1½	to 1 4½	4.79 to 5.46
			C. per Lb.
Ship plates.	9 5	to 9 15	1.84 to 1.94
Boiler plates.	12 10	to 13 0	2.49 to 2.59
Tees.	9 15	to 10 0	1.94 to 1.99
Channels.	9 0	to 9 5	1.79 to 1.84
Beams.	8 15	to 9 0	1.74 to 1.79
Round bars, ¾ to 3 in.	10 5	to 10 15	2.04 to 2.14
Galvanized sheets, 24 g.	19 0	to 19 5	3.78 to 3.83
Black sheets, 24 gage.	14 0		2.79
Black sheets, Japanese			
specifications.	15 5		3.04
Steel hoops.	12 0	& 12 10*	2.39 & 2.49*
Cold rolled steel strip,			
20 gage.	17 5		3.43
Cotton ties, Indian speci-			
fications.	15 0		2.99

*Export price. †Ex-ship. Tees, nominal.

Continental Prices, All F. O. B. Channel Ports

(Nominal)			
Foundry pig iron:			
Belgium.	£5 5s.	to £5 10s.	\$23.41 to \$24.53
France.	5 5	to 5 10	23.41 to 24.53
Luxemburg.	5 5	to 5 10	23.41 to 24.53
Billets (nominal):			
Belgium.	7 0		31.22
France.	7 0		31.22
Merchant bars:			
Belgium.	8 0	to 8 2½	1.59 to 1.62
Luxemburg.	8 5		1.64
France.	8 5		1.64
Joists (beams):			
Belgium.	7 12½	to 7 15	1.53 to 1.54
Luxemburg.	8 2½		1.62
France.	7 17½		1.57
Angles:			
Belgium.	8 0	to 8 5	1.59 to 1.64
½-in. plates:			
Belgium.	8 10		1.69
Germany.	8 10		1.69
¾-in. plates:			
Luxemburg.	8 7½		1.67
Belgium.	8 7½	to 8 10	1.67 to 1.69

NEW TRADE PUBLICATIONS

Electric Motors.—Wagner Electric Corporation, St. Louis. Bulletin 134, four pages. Describes Fynn-Welch constant-speed, a. c. motor. Load characteristics are shown, and also illustrations of the stator and rotor.

Gear Data.—Lees-Bradner Co., Cleveland. Loose leaf book with pages 4 x 7 in. Included in the data is the solution of right angle triangles by trigonometry reduced to simple arithmetic, data on spur gears, gear generation on the company's grinder, finding pitch diameter or helix angle of helical gears, changing spur gears to helicals and other kindred material. Additional sheets will be added from time to time and it is expected that this book will grow eventually into an extensive collection of gear data.

Universal Grinding Machines.—Cincinnati Grinder Co., Cincinnati, 1923 catalog, 33 pages. Describes machine made in eight sizes for grinding straight or tapered work externally and internally, flat work that can be held in faceplate or chuck, and adapted for sharpening reamers, milling cutters and other work. Fixtures for internal grinding, motor drive arrangements, control of the machine and the unit system of construction are described in detail.

Used Machine Tools.—McCabe & Sheeran Machinery Corporation, 50 Church Street, New York. Booklet of 24 pages lists surplus machine tools, blowers, air compressors, pumps, presses, foundry equipment, steel foundry equipment, engines and generators, cranes and hoists, boiler shop and other equipment for sale direct from shop where used. The plants are located in several cities.

Thermit Rail Welding.—Metal & Thermit Corporation, 120 Broadway, New York. Pamphlet No. 15, 6 x 9 in., 72 pages. Treats of the advantages of thermit welded rail joint and how the thermit weld is made. A section is also given to making of special track work by the thermit process and another to repairing cast-iron bound special work. The pamphlet concludes with a theory of rail joints, by Felix Lange.

Foundry Equipment.—Adams Co., Dubuque, Ia. Catalog No. 30, size 8½ x 11 in., 55 pages. Under the title of "Labor Savers for the Foundry," the catalog describes and illustrates in seven sections various items of foundry equipment. Included are squeezers, molding machines, snap flasks, steel jackets and frames, rappers, and other equipment. A feature is an information section giving among other material instructions for making cast match plates, method of operation with match plates and when carded patterns must be used.

Woodworking Machinery.—Hall & Brown Wood Working Machine Co., St. Louis. Sectional catalog of more than 150 pages, bound in loose leaf form. Describes and illustrates the features of the planers, surfacers, new model stickers, molding machines, hollow chisel mortisers, shapers, rip saw benches, cut-off and swing saws, band saw machines, and many other items manufactured by the company.

Woodworking Machinery.—Hall & Brown Wood Working Machine Co., St. Louis. Booklet having pages 21½ in. wide and 13 in. high, 20 pages. Illustrations are on right hand pages, covering the full width of page, the description and dimensions of machines being on the following page. The items shown include planers and matchers, new model inside molder, with top and bottom profilers and resawing machines.

Twist Drill Pointers.—Oliver Instrument Co., Adrian, Mich. Pamphlet of eight pages 8½ x 11 in., explaining the principle of the company's automatic drill pointer. The Nos. 2, 4 and 5 machines are described and illustrated.

Flexible Couplings.—Falk Corporation, Milwaukee. Eight-page pamphlet dealing with the Falk-Bibby coupling, for which great flexibility is claimed. Cushioning, heavy shocks and damping out torsional oscillations are features. Both parallel and angular misalignments are taken care of without the use of rubber or other soft materials. Power is transmitted between two flanges through specially constructed grid springs of tempered steel.

Diesel Engines.—Fulton Iron Works Co., St. Louis. Thirty-two-page catalog describing power equipment

for the use of oil fuel. The pamphlet is heavily illustrated, including both installation and construction views and diagrams. Among the engines illustrated are several of 1000 hp. or larger.

The Constantator Regulator.—Dempsey Furnace Co., 15 Park Row, New York. Eight-page catalog describing a regulator for damper, fan speed, stoker speed, etc., for industrial boilers. It is said to save fuel through greater regularity of operation than with other types of apparatus, and to do this by keeping out of the furnace both excess fuel and excess air for combustion.

Mechanical Hot-Blast Heater.—B. F. Sturtevant Co., Hyde Park, Mass. Eight-page folder devoted to heating air for industrial purposes and particularly for the heating of factories. The design depends upon the subdivision of gases of combustion into many small streams which pass in contact with the walls of the tubes and thus heat the air passing through the heater.

Nebulyte Oil Burner.—The Anthony Co., Long Island City, N. Y. 4-page folder devoted to an oil burner operating mechanically to distribute a uniform spray for combustion. Positive mechanical action with definite liquid pressure gives the particles of oil a definite swirling motion, dispersing them into a hollow umbrella cone of spray to fit combustion conditions.

Venturi Low Pressure Oil Burner.—Hauck Mfg. Co., Brooklyn, N. Y. 8-page folder devoted to a burner for fuel oil which is said to produce a clean and intense flame under full control, to insure perfect combustion through perfect atomization and proper air regulation, to light instantly in a cold furnace and to bring it quickly up to the desired temperature. The burner is designed for a wide variety of industrial uses.

Ball Test Applied to Cement Mortar and Concrete

Under the above title the engineering department of Purdue University has issued Bulletin No. 12 of 32 pages, describing tests of concrete in resistance to impact. The tests were intended to show the relation of compressive strength to surface hardness, particularly as affecting concrete roads; the effect of age and mix upon the surface hardness; the effect of tire loads, etc. The results are shown largely in diagrams and appear to bear out the conclusion that the ball test affords a valuable and convenient means of study for the purposes indicated.

Metal Lath Data Book

Issued by the Truscon Steel Co., Youngstown, Ohio, this 48-page booklet, 8½ x 11 in., is said to be the most complete data book on this subject which has ever been published. Numerous details of design for walls and ceilings of various types, together with paneling and ornamental work, make the booklet of value to architects and engineers. Illustrations of buildings where metal lath has been used show methods of treatment, while specifications in detail, both as to the application of the lath and the application of plaster or stucco to it and the use of coloring pigments make the work unusually complete for its specific purpose. Tables of loads are useful in design.

Tests of Powdered Coal Plant

Technical paper No. 316 of the Bureau of Mines covers in 22 pages results of two boiler tests, six dryer tests, and eight mill tests showing the amount of power used by pulverizing mills, the extent to which drying is practicable, and the overall thermal efficiency from the total coal used to the steam. This reached a maximum of 78.2 per cent. Attention was called in the conclusion to the excessive erosion of the furnace lining caused by the high temperature of the flame. This is attributed to the low melting point of the ash in Illinois coal, causing it to run over the lining and wear it away.

Acid Electric Steel Castings

(Continued from page 1249)

ter until it begins to feel moist. A small amount can be tried to note how it packs. If too dry, more slurry can be added; if too wet, a small amount of dry ganister is added. This is then shoveled into the furnace and rammed about the sides. An air rammer should be used, both from the standpoint of good hard ramming, and also from a time point of view. This mixture is gradually rammed into the shape desired, and is then run up along the side walls as high as possible. It cannot be rammed too hard, and should be given plenty of attention to avoid any soft spots. When completed, sodium silicate is spread on with a brush all over the banks, and especially where the banks join the wall bricks. This will harden the walls, and prevent any spalling while baking is taking place. It also tends to cement the rammed mixture to the wall bricks.

The roof is now set and a very slow wood fire is started in the furnace. This is kept going until the bricks are heated, and is gradually increased until a good-sized bed of coals are on the hearth and until the heat can be felt on the bottom shell, which will usually take from 10 to 12 hr. A bed of coke is thrown on the coals, about 8 to 10 in. deep, and the electrodes lowered until contact is made. Run power on the lowest possible point until the bed of coke becomes white hot. Power can then be shut off, and run at intervals, only enough being used to keep the hearth in a white hot condition. Four to six hours is ample for this operation, and about 1000 kw. hr. will have been consumed. (Figures are for a furnace of 3 to 5 tons capacity). The residue of coke and ashes can now be raked out and the furnace charged for the first heat.

Charging the Furnace

In charging the furnace, care should be taken to have such a charge that, when in the furnace, it will be closely packed and as much under the electrodes as possible. A closely packed charge will melt faster and cleaner than a loose one, and the more of the charge under the electrodes, the greater the percentage of the direct arc which plays on the metal. It is for this reason that high side walls, making a deep, cup-shaped hearth, are recommended. Any scrap along the banks will fall under the arcs by its own weight, giving a saving of time in poking and in raking scrap from the side walls.

The best way to obtain the above is by charging the heavy chunks on the hearth, and then shoveling in the light scrap, which will pack in between the large pieces, making a very desirable charge. When shop scrap is used, it is usually preferable to get it in on the bottom. For general steel casting work, I have found that a charge of from 25 to 30 per cent of heavy scrap, the balance light, will give excellent melting down conditions. This charge should be made up of material averaging about 0.30 per cent carbon and 0.50 per cent manganese. About three large scoops of sand should be spread over the hearth before charging, to furnish slag for the melting down period. Such a charge of metal, if fairly clean, will melt down at about 0.15 per cent carbon, with sufficient residual manganese and silicon to keep from being heavily over-oxidized. If the scrap is heavily oxidized or very dirty, a larger amount of sand is charged for slag. I prefer to melt down under a rather heavy slag, for several reasons:

1. It does not attack the hearth or side walls, the iron oxide of the metal being satisfied with its own slag body.
2. It protects the roof and wall from the arc radiation, eliminating "watery" or "glassy" conditions.
3. By preventing a "watery" condition, over-oxidizing of the metal is eliminated.
4. The slag body throws most of the heat used into the metal, eliminating radiation, with its attendant power loss.

It often happens that, due to heavily oxidized scrap, the bath will melt down too low in carbon, requiring much working to bring it back. Under such conditions of scrap metal, a few shovels of ground coke thrown in with the charge will materially help, by causing the bath to melt down under nearly neutral conditions.

The charge being in, the current is turned on, the

doors are sealed and melting begins. During this period, avoid as far as possible any delays as they mean needless oxidizing. The doors should be kept closed as much as possible to prevent air entering the furnace and to conserve heat. As soon as the flame begins to come up around the electrodes, the bath can be inspected, and any loose scrap on the banks shoved in. After heating for 5 or 10 min. the metal should be inspected as to slag conditions, and a test taken for carbon. If the slag is too heavy, enough can be raked off to leave the furnace in a condition ready to finish the heat. If the slag comes down thin, sand can be added.

Much information can be obtained during the melt down, by a careful observation of the flame and color of smoke issuing from around the electrodes. This gives an excellent idea of how melting is progressing, and saves opening the doors. During the early part of the melting down there will be no flame issuing from the roof part, and the smoke will be of a dark brownish color. If any coke has been added to the charge, this smoke will be black until the carbon has either been absorbed in the metal, or burned out by the oxides. When the bath is nearly all melted, and a good-sized pool has formed, the flame will begin to appear. If very sharp and of a bluish color, oxidizing conditions are prevailing, and the chances are the metal will melt dead. The slag, under these conditions, will be very thin. If the flame is luminous, and accompanied by heavy white fumes, you are under a reducing action and the metal will melt down high in carbon, manganese and silicon. The slag will be very thick and gummy on a heat of this character. The best conditions are when a fairly soft flame, together with brownish smoke, is emitted. This denotes a fairly neutral condition, and will result in a slag of the proper consistency, together with metal of the proper analysis.

There are many different methods used in taking this first test for carbon. I prefer to add a pinch of very fine ferrosilicon to the test spoon in order that a sound fracture may be obtained, as this is an aid in reading the carbon. For work of a special nature, where very close analyses are desired, drillings from the test should be sent to the laboratory for carbon and manganese.

There is little to do now until the metal heats up. The slag should be kept of the proper consistency, so that it bubbles easily, allowing any gases from the metal to escape. At this period the slag will usually be of a dirty color—black, brownish, or probably a very dark, dirty green. As reduction proceeds, this color will change to a grayish, then a greenish, gradually becoming lighter in color as the oxides are eliminated, until the perfect finishing slag color of a greenish yellow is obtained.

The first slag of a dark color will owe its color mainly to iron oxide. Such a slag, at melting, will probably contain from 10 to 20 per cent iron oxide, depending on melting conditions. In this slag will also be about 10 per cent of manganese oxide, the balance being silica, with a small amount of lime or magnesia. With such a slag the metal will be "wild" and in no condition to pour. This slag must therefore be "worked" similarly to a basic one, and the proper performance of this is what makes either a good or a mediocre heat.

The first duty is, therefore, the elimination of the iron oxide. This is accomplished by two distinct reactions, in which carbon is the element which causes the reduction. This may come either from the electrodes, the carbon in the steel, or from coke spread over the surface of the slag. If from the bath, your analysis is changing; if from the electrodes, your costs are increasing, due to needless electrode consumption. The most logical way therefore to start the reaction is by spreading a few shovels of finely ground coke over the bath. As the main product of this reduction is a gas, carbon monoxide, the slag must be kept thin enough to allow it free passage.

As reduction proceeds, the slag becomes lighter in color, and also thicker, due to its ever increasing silica content. As soon as the slag is freed from the iron oxide, the reduction will transfer its effort to reducing silicon from the slag.

If allowed to continue, the result will be a bath of metal too high in silicon. The proper method of procedure is, therefore, to pour, as soon as the iron oxide has been thoroughly reduced. The question is, therefore, how to tell when this condition is attained. Our method is to take a metal test every five minutes after the bath is melted. This is inspected for temperature, soundness of metal, and condition and color of slag. If slag is a little heavy it can be thinned by a judicious use of fine lime. As these tests proceed, it is noticed that the slag gradually becomes lighter and thicker as the metal becomes hotter.

The flame from around the electrodes has now changed into a very soft luminous one, and heavy white smoke is emitted. The appearance of the furnace is now similar to the basic process under finishing conditions, except that reduction is not so intense as to cause "snow." This is due to the manganese oxide content in the slag which would have to be reduced before the silica would reduce sufficiently to cause the powdering or "snowy" conditions, so pronounced in the basic process.

The slag will be bubbling vigorously, and all gas in the metal will be rapidly removed. At about the time the metal becomes hot enough to pour, it will be noticed that the slag has a puffy appearance, and seems to be foaming on the bath. A sample taken will be rather viscous and be yellowish green in color. The metal test will show quiet in the spoon and lie rather quiet in the test mold. The manganese is now added to the furnace and the heat poured.

Where there is a great deal of shanking to do on light castings, the metal is further superheated for about 10 min. The silicon picked up is allowed for in our alloy additions. Manganese usually gives a return of 95 to 100 per cent of the amount added, and the practice for a 0.65 per cent manganese content, is to add 0.40 per cent to the furnace and 0.25 per cent crushed to the ladle. Silicon, figured at 0.20 per cent, is added to the ladle in finely crushed pieces. Aluminum is added in the ratio of $\frac{1}{2}$ lb. per ton of metal. Such a heat, when poured into the ladle, will pour very quiet, the slag holding back until most of the steel is in the ladle. The slag will foam up on the ladle, and string out in long threads from the furnace spout. Such a heat will prove of exceptional quality, and regular analyses are constant. Where high carbons are desired, pig iron to the desired amount is added long enough before the pour not to chill the steel. The carbon will rapidly drop, due to being reduced by the silicon, and about 0.05 per cent higher than desired should be added.

Many acid electric operators follow the practice of immersing their electrodes, with the power off, in the bath for a given number of seconds to raise the carbon. This is usually done just before the pour. I do not recommend this practice at all. In the first place, it is rather expensive to use the electrodes at 6c. or 7c. per lb. for a carbonizing agent, and in the second place there are so many variables which will change the result—the heat of metal, volume and character of slag, area of electrode exposed to metal, etc.

The foregoing covers the practice necessary for general operations on soft steel casting work. There are yet other points for consideration.

High-Carbon Steel

Very often specifications come into the shop requiring carbon content of 0.40 to 0.50 per cent, and even up as high as 1.00 per cent for very special work. If a heat was to be melted down under "soft" conditions the amount of pig iron required to raise to 1.00 per cent would be excessive; it would be very uneconomical regarding cost of metallic charge, and would prolong the time of heat and greatly increase the power consumption, due to its chilling effect.

The solution is to melt down "high." This can be done either by charging high-carbon scrap, such as springs, etc., or by the addition of coke to the charge. Either way is satisfactory, and fairly good results can be obtained if a little close calculating is done. The amount of coke to add will vary greatly depending on character of scrap, size of charge, etc., and can be de-

termined for each shop only by experience. When using coke additions to a good grade of boiler steel scrap, I generally figure 10 points higher than desired, assuming the coke to contain 60 per cent effective carbon. This coke is thrown in about the center of the charge, in pieces approximately pea size.

A charge of this kind will always melt down high in manganese and silicon and recourse must be had to the chemist to run a carbon and manganese on the preliminary. Final additions can be calculated from these results. Silicon is judged by the solidity of the test piece and general appearance of fracture. A silicon content of about 0.15 per cent will just give a solid test block. A decrease will result in blow holes, while an increase gives the common "silicon line" to the grain.

In these classes of steel great precaution must be observed as to the temperature of casting. Castings from very hot metal will crack and tear excessively, especially if there is any tendency to obstruct the natural contraction.

Chrome Steel

These steels are easily made, the ferrochrome being added about 5 to 10 min. before pouring, sufficient being added to allow for an oxidation loss of 10 points. If the slag is the least bit thick the lumps should be moistened with water to kick the slag aside. This is good practice on adding any ferroalloys to the acid furnace, and helps greatly to eliminate any hard spots in the finished casting.

While there are, no doubt, many different methods of obtaining regular results, and while other operators may be able to improve on the foregoing practice, I have found it to be very simple, reliable and economical and giving metal worthy of the name "electric steel."

Log of a 3-ton Electric Heat—Soft Steel

Specification:	
60,000 lb. per sq. in. tensile strength.	
22 per cent elongation in 2 in.	
Steel Made:	
Carbon	0.24%
Manganese	0.62%
Silicon	0.30%
Phosphorus	0.043%
Sulphur	0.036%
Tensile strength.....	72,000 lb. per sq. in.
Elongation	26 per cent
Bend	180 deg., flat on itself
Charge:	
Structural steel.....	3,000 lb.
Shop scrap	1,800 lb.
Boiler clippings	3,000 lb.
Total	7,800 lb.
Shop scrap charged on hearth, the structural steel next, and all holes filled with clippings. Two scoops molding sand on hearth.	
Time	
8:00:	Current on at high voltage.
8:45:	Nearly all melted. Slag moderately thick, but melting under good oxidizing conditions.
9:00:	All melted, and fairly hot. Changed over to low voltage. Slag test shows fairly thin, dead black in color. Metal test at about 0.12 per cent carbon, judged by fracture; 20 lb. ground coke spread over surface of bath.
9:05:	Slag shows thin gray line, but still dirty. Metal unchanged.
9:10:	Slag dark green in color, and beginning to thicken; 10 lb. fine lime thrown in under electrodes. Metal test shows a little higher in carbon. Slag well rabbled, and then given another light coke covering.
9:15:	Slag bubbling vigorously and of good "dry" appearance. Sample shows greenish blue in color. Beginning to thicken. Metal hot, pouring clean from spoon. Carbon close to 0.18 per cent.
9:20:	Reduction very heavy. White smoke and very luminous flames coming from around electrodes. Slag perfect, yellowish green in color and viscous when taken from furnace. Metal hot, quiet in spoon, showing 0.18 to 0.20 per cent carbon. Silicon being reduced from slag, and hearth. Ferromanganese figured at 0.40 per cent added to furnace.
9:23:	Heat poured. Ferrosilicon at 0.20 per cent, and manganese at 0.25 per cent added in ladle. Slag foaming on ladle, metal good and hot. All conditions excellent.
Time of heat, 1 hr. 23 min.	
Kilowatt hours per ton of charge, 540.	

Log of a 3-ton Electric Heat—Hard Steel

Specification:	
80,000 lb. per sq. in. tensile strength.	
15 per cent elongation in 2 in.	
Steel Made:	
Carbon	0.42%
Manganese	0.60%

Silicon	0.35%
Phosphorus	0.045%
Sulphur	0.033%
Tensile strength.....	88,500 lb. per sq. in.
Elongation	19.4 per cent in 2 in.
Bend	160 deg. on 1 in. mandrel

Charge:

Open-hearth rail.....	2,800 lb.
Shop scrap	4,200 lb.

Total 7,000 lb.
Three scoops ground coke on hearth, together with two scoops molding sand. Shop scrap charged next, with rail on top.

Time
1:00: Current on at high voltage.
1:30: Flames beginning to come from electrode ports showing luminous, with white smoke. Melting down under reducing conditions.
1:50: All melted. Slag rather thick, and dark green in color. Metal test taken, shows about 0.40 per cent carbon. Sent to chemist for manganese and carbon analyses; 30 lb. iron ore added.
1:55: Slag too thick, raked about half off; 30 lb. iron ore again added. Metal test showing too high in silicon.
2:00: Slag conditions better, beginning to bubble. Metal boiling quietly, test showing silicon being removed.
2:05: Chemist reports manganese at 0.29 per cent, and carbon at 0.38 per cent. Slag blue green and looking fine. Metal getting rather hot, carbon test estimated at 0.05 below first test.
2:10: Reducing conditions excellent. Slag bubbling vigorously showing good greenish yellow color, viscous. Metal hot, test showing a slight pick up in silicon. Manganese added at 0.40 per cent.
2:13: Heat poured. Silicon at 0.15 per cent to ladle. No manganese, but 1½ lb. aluminum. Conditions excellent.
Time of heat 1 hr. 13 min.
Kilowatt hours per ton of charge, 510.

Log of a 3-ton Electric Heat—Special Steel

Specifications:

Carbon	0.90 to 1.00%
Manganese	not over 0.55%
Silicon	not over 0.30%
Chromium	0.90 to 1.00%

Steel Made:

Carbon	0.97%
Manganese	0.45%
Silicon	0.26%
Chrome	0.93%

Charge:

Old coiled springs..... 5,800 lb.
20 lb. ground coke on hearth, with two scoops sand.
Time
10:00: Current on at high voltage.
10:50: All melted, switched over to low voltage. Slag rather thin and black in color. Metal test taken and sent to chemist. Second metal taken, and broken, but too high to read with any accuracy. Metal shows good, and fairly clear.
11:00: Metal beginning to heat up. Gave two scoops sand to thicken slag. Slag still black.
11:05: Chemist reports carbon at 0.61 per cent and manganese at 0.18 per cent. 200 lb. low phos. pig iron added, and bath thoroughly rabbled. Second test sent to chemist.
11:10: Slag showing trace of green color, and beginning to thicken. Metal moderate in temperature. Light covering of coke spread over surface of bath.
11:15: Slag looking better, showing bluish green. Metal getting rather hot. Reducing conditions good, and silicon beginning to work on slag.
11:20: Slag beginning to work, still bluish green in color, but beginning to assume viscous character. Metal hot and pouring clean from spoon. Chemist reports carbon at 0.96 per cent.
11:25: Slag excellent in every respect. Manganese at 0.35 per cent, and ferrochromium at 1.05 per cent chrome added. Bath given dusting of ground coke.
11:30: Heat poured. Silicon to ladle at 0.10 per cent.
Time of heat 1 hr. and 30 min.
Kilowatt hours per ton of charge, 585.

The J. Friedland Co., Inc., 293 Greenpoint Avenue, Brooklyn, has been incorporated with capital stock of \$50,000 to manufacture show cases. It proposes to continue a business already established in this line. Joseph Friedland and Ephraim Goldberg, 2783 Webb Avenue, New York, are the chief incorporators.

Hugo Falck & Co., Ltd., New York, incorporated with \$250,000 capital stock, will undertake the development of iron and other ore properties and may manufacture non-ferrous alloys. The incorporators are S. H. Hofstadter, H. Riegelman, and P. Berner. Present address is in care of Mr. Samuels, Room 807, 67 Wall Street.

Plans of New Companies

The Superior Saw Mfg. Co., 1324 Metropolitan Avenue, Brooklyn, organized with \$20,000 capital stock to manufacture saws, blades, etc., is now operating on these lines.

The Shoe Cleaner Services, Inc., 1160 East Sixteenth Street, New York, incorporated with \$100,000 capital stock to manufacture electrically operated shoe-shining machinery, will for the present act as a development company for the Automatic Shoe Shining Machinery Co., incorporated a few months ago. The incorporators are G. P. Grant, L. M. Bainbridge and H. B. Jiltze.

Goodwin-Pray, Inc., Elizabeth, N. J., has been organized with capital stock of \$50,000 to manufacture electrical machinery, taking over an established concern in this line. John G. Sauerwin, 715 Elizabeth Avenue, Elizabeth, N. J., heads the company.

The P. L. & W. Surgical Instrument Co., 144 Howard Street, Newark, N. J., has been organized to manufacture surgical instruments, and is now active on a small scale. Frank Pentek heads the company.

The Penn Brass & Copper Co., Erie, Pa., recently incorporated with \$50,000 capital stock, has begun manufacturing seamless brass and copper tubes in its factory at 1120-30 West Eighteenth Street. E. S. Roach is president and Karl W. Wilks, general manager.

The Universal Cooler Co., Detroit, has been incorporated with \$200,000 capital stock to manufacture electric cooling equipment. Plans are withheld for the present. Address is in care of Patterson Farmer, People's Finance Corporation, 954 Book Building.

The Arbetter Felling Machine Co., St. Louis, has been organized under Delaware laws with capital of \$2,500,000 to manufacture textile and other machinery. This follows the consolidation of the company by that name of Boston and the Lewis Felling Machine Co. of St. Louis. Plant and all assets have been transferred to St. Louis where operations will continue as formerly. Charles L. Knower, 3763 Forest Park Boulevard, St. Louis, is one of the principals.

The Percoplate Boiler Sales Co., Newark, N. J., has been incorporated with \$100,000 capital stock to make and deal in boilers and equipment. It is not ready to make announcement of plans. H. B. Mead, 111 Gotthart Street, is secretary.

The Sloan & Zook Tank Car Co., Bradford, Pa., incorporated with \$125,000 capital stock, will operate as a subsidiary of the Sloan & Zook Co., Bradford. The new company will take over and operate the cars formerly owned by the parent company. William J. Sloan is one of the heads.

The U. S. E. Corporation, 7 West Sixty-first Street, New York, recently organized to manufacture automotive accessories, is now in production on spring bumpers. S. H. Shaw heads the company.

The R. L. Carter Co., Inc., 101 Benedict Avenue, Syracuse, N. Y., incorporated with capital stock of \$25,000, has taken over the business of the R. L. Carter Co., that city, and will manufacture electric hand shapers and routers. It is equipped for immediate needs. R. L. Carter is president; E. M. Eustis, treasurer, and R. C. Eustis, secretary.

The Damascus Crucible Steel Casting Co., New Brighton, Pa., incorporated with capital of \$300,000, will continue a business established 15 years in the manufacture of castings. A new plant is being built at Hammond, Ind., which will be ready for operation about Dec. 1. Buildings at Hammond were built by the Truscon Steel Co. and will house a 2-ton Heroult furnace. Grinding machines are being built by the Cincinnati Grinder Co. Contracts for the rest of the machinery will be let soon. Charles Capper is president.

A certificate of incorporation has been granted the Aetna Steel & Iron Co., Inc., Southington, Conn., which recently purchased manufacturing property in Southington. Authorized capitalization is \$170,000. The company will begin business with \$65,000. Boston and Pawtucket, R. I., interests are interested in the company.

The Carm Convertible Car Corporation, 46 East Forty-first Street, New York, has been incorporated with \$5,000,000 capital stock under Delaware laws, to manufacture automobile bodies. Negotiations are under way to build a special type body. Plans are as yet indefinite, but it is likely that a plant will be located in Pennsylvania or the Middle West.

The Muir Valve & Plumbing Supply Co., New York, has been incorporated with \$100,000 capital stock to manufacture and deal in valves, plumbing equipment, fittings, etc. Plans are as yet indeterminate. J. Muir, who is connected with the Mitchell Co., 621 West Twenty-fourth Street, New York, is one of the principals.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipments in carload lots from mills, these prices are given for their convenience.

On a number of items the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-Ferrous Metals."

Iron and Soft Steel Bars and Shapes

Bars:

Refined iron bars, base price	3.54c.
Swedish charcoal iron bars, base....	7.00c. to 7.25c.
Soft steel bars, base price	3.54c.
Hoops, base price	5.19c.
Bands, base price	4.39c.
Beams and channels, angles and tees, 3 in. x ¼ in. and larger, base	3.64c.
Channels, angles and tees under 3 in. x ¼ in. base	3.54c.

Merchant Steel

	Per Lb.
Tire, 1½ x ¼ in. and larger	3.60c.
(Smooth finish, 1 to 2½ x ¼ in. and larger) ..	4.10c.
Toe-calk, ½ x ¼ in. and larger	4.60c.
Cold-rolled strip, soft and quarter hard..	7.50c. to 8.50c.
Open-hearth, spring-steel	4.50c. to 7.50c.
Shafting and Screw Stock:	
Rounds	4.40c.
Squares, flats and hex.	4.90c.
Standard tool steel, base price	15.00c.
Extra tool steel	18.00c.
Special tool steel	23.00c.
High speed steel, 18 per cent tungsten....	75c. to 80c.

Tank Plates—Steel

¼ in. and heavier	3.64c.
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Sheets

Blue Annealed

	Per Lb.
No. 10	4.20c. to 4.59c.
No. 12	4.25c. to 4.64c.
No. 14	4.30c. to 4.69c.
No. 16	4.40c. to 4.79c.

Box Annealed—Black

	Soft Steel C. R. One Pass Per Lb.	Blued Stove Pipe Sheet Per Lb.
Nos. 18 to 20	4.30c. to 4.55c.	.....
Nos. 22 and 24	4.35c. to 4.60c.	4.85c.
No. 26	4.40c. to 4.65c.	4.90c.
No. 28	4.50c. to 4.75c.	5.00c.
No. 30	4.70c. to 4.95c.	.....
No. 28 and lighter, 36 in. wide, 20c. higher.		

Galvanized

	Per Lb.
No. 14	4.60c. to 4.85c.
No. 16	4.75c. to 5.00c.
Nos. 18 and 20	4.90c. to 5.15c.
Nos. 22 and 24	5.05c. to 5.30c.
No. 26	5.20c. to 5.45c.
No. 27	5.35c. to 5.60c.
No. 28	5.50c. to 5.75c.
No. 30	5.95c. to 6.20c.
No. 28 and lighter, 36-in. wide, 20c. higher.	

Welded Pipe

Standard Steel			Wrought Iron		
	Black	Galv.		Black	Galv.
½ in. Butt.	—41	—24	½ in. Butt.	—4	+19
¾ in. Butt.	—46	—32	¾ in. Butt.	—11	+9
1-3 in. Butt.	—48	—34	1-1½ in. Butt.	—14	+6
2½-6 in. Lap.	—44	—30	2 in. Lap.	—5	+14
7-8 in. Lap.	—41	—11	2½-6 in. Lap.	—9	+9
9-12 in. Lap.	—34	—6	7-12 in. Lap.	—3	+16

Steel Wire

	Per Lb.
Bright basic	4.75c. to 5.00c.
Annealed soft	4.75c. to 5.00c.
Galvanized annealed	5.40c. to 5.65c.
Coppered basic	5.40c. to 5.65c.
Tinned soft Bessemer	6.40c. to 6.65c.

*Regular extras for lighter gage.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	17 c. to 18 c.
High brass wire	17½c. to 18½c.
Brass rods	14¼c. to 15¼c.
Brass tube, brazed	25 c. to 26½c.
Brass tube, seamless	21½c. to 22½c.
Copper tube, seamless	23 c. to 24 c.

Copper Sheets

Sheet copper, hot rolled, 19¼c. to 20¼c. per lb. base.	
Cold rolled, 14 oz. and heavier, 3c. per lb. advance over hot rolled.	

Tin Plates

Bright Tin	Grade	Grade	Coke—14 x 20	Prime	Seconds
	"AAA"	"A"	80 lb.	\$6.55	\$6.30
	Charcoal	Charcoal	90 lb.	6.65	6.40
	14x20	14x20	100 lb.	6.75	6.50
IC.	\$12.55	\$10.70	IC.	7.00	6.75
IX.	13.95	12.55	IX.	8.25	8.00
IXX.	15.55	13.75	IXX.	9.50	9.25
IXXX.	17.10	15.30	IXXX.	10.75	10.50
IXXXX.	18.85	16.80	IXXXX.	12.00	10.75

Terne Plates

	8 lb. coating, 14 x 20
100 lb.	\$7.00 to \$8.00
IC	7.25 to 8.25
IX	8.25 to 8.75
Fire door stock.	9.00 to 10.00

Tin

Straits pig	44c.
Bar	48c. to 50c.

Copper

Lake ingot	15¼c.
Electrolytic	15¼c.
Casting	14¼c.

Spelter and Sheet Zinc

Western spelter	7¼c.
Sheet zinc, No. 9 base, casks.	10¼c. open 11c.

Lead and Solder*

American pig lead.	8¼c. to 8¼c.
Bar lead	10c. to 12c.
Solder ½ and ½ guaranteed.	31c.
No. 1 solder	29c.
Refined solder	25c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb.	75c. to 90c.
Commercial grade, per lb.	35c. to 50c.
Grade D, per lb.	25c. to 35c.

Antimony

Asiatic	9¼c. to 10c.
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Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb.	36c.
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Old Metals

The market is very unsettled in sympathy with ingot copper. Dealers' buying prices are nominally as follows:

	Cents Per Lb.
Copper, heavy crucible	10.50
Copper, heavy wire	10.00
Copper, light bottoms	8.25
Brass, heavy	5.50
Brass, light	4.75
Heavy machine composition	8.25
No. 1 yellow brass turnings	5.50
No. 1 red brass or composition turnings.	7.25
Lead, heavy	6.00
Lead, tea	5.00
Zinc	4.00
Cast aluminum	15.00
Sheet aluminum	15.00